

FINAL ENVIRONMENTAL ASSESSMENT

FRANKENMUTH DAM FISH PASSAGE CASS RIVER SAGINAW COUNTY, MICHIGAN



Photo Simulation of Proposed Rock Ramp Fish Passage

**U.S. ARMY CORPS OF ENGINEERS
DETROIT DISTRICT**

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This document addresses the potential environmental impacts associated with the proposed action which includes the construction of fish passage at the Frankenmuth Dam on the Cass River in Saginaw County, Frankenmuth, Michigan. The proposed action is being accomplished under Section 506 (Great Lakes Fishery and Ecosystem Restoration) of the Water Resources Development Act (WRDA) of 2000 (42 U.S.C. 1962d-22[c], PL 106-541), as amended. Alternatives considered include: a fish bypass channel, a rock ramp, a spiral fish ladder, dam removal, and no federal action. The preferred alternative is construction of a rock ramp starting approximately 350 feet downstream of the Frankenmuth Dam and creating rock weirs and resting pools along a gradual slope (approximately 2.9%) up to and encompassing the existing dam's footprint. The rock ramp would provide passage for fish species targeted for recovery in the Great Lakes (i.e., walleye). An Environmental Assessment (EA) for the proposed action has been completed. The Draft EA and Preliminary Finding of No Significant Impact (FONSI) were made available to the public for a 30 day review period beginning February 3, 2012. USACE attended a public information meeting in the City of Frankenmuth on February 28, 2012 to discuss the proposed action and answer questions. Comments regarding the proposed action were received and responded to none of which were significant in nature. This EA indicates that the preferred alternative would not result in significant environmental impacts on the quality of the human environment. Adverse effects would include short-term noise, air emissions and traffic from construction equipment operation; temporary, minor turbidity during construction activities; temporary displacement of fish and wildlife during construction; destruction of bottom dwelling organisms in the immediate work area; minor removal of vegetation along the proposed access roads; and possible increased passage of the sea lamprey. No significant increase in the 1% flood event elevation is anticipated as a result of the proposed action. Fish and wildlife would return upon completion of construction, and the area eventually would re-colonize with bottom dwelling organisms from adjacent areas. Disturbed areas would be re-vegetated. Although additional lamprey may pass as a result of the proposed action, their reproduction rate would not likely increase due to lack of preferred lamprey habitat upstream of the dam and the U.S. Fish and Wildlife Service's lamprey control methods (i.e., use of lampricides or traps). This action would alter the stream at this location, but provide numerous benefits. The project would restore access to approximately 73 miles of riverine and tributary habitat, considerably increasing access to desirable spawning and juvenile rearing habitat that was

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FRANKENMUTH DAM FISH PASSAGE CASS RIVER SAGINAW COUNTY, MICHIGAN

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An Environmental Assessment (EA) for the proposed action has been completed. The Draft EA and Preliminary Finding of No Significant Impact (FONSI) were made available to the public for a 30 day review period beginning February 3, 2012. USACE attended a public information meeting in the City of Frankenmuth on February 28, 2012 to discuss the proposed action and answer questions. Comments regarding the proposed action were received and responded to; none of which were significant in nature.

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areas would be re-vegetated. Although additional lamprey may pass as a result of the proposed action, their reproduction rate would not likely increase due to lack of preferred lamprey habitat upstream of the dam and the U.S. Fish and Wildlife Service's lamprey control methods (i.e., use of lampricides or traps).

This action would alter the stream at this location, but provide numerous benefits. The project would restore access to approximately 73 miles of riverine and tributary habitat, considerably increasing access to desirable spawning and juvenile rearing habitat that was historically available to walleye and other desirable fish species in the Saginaw Bay watershed. The rock ramp would replace and potentially provide additional riffle and spawning habitat for invertebrate organisms and fish species such as lake sturgeon. Construction of the rock ramp is also anticipated to increase water turbulence, thus resulting in a beneficial increase in dissolved oxygen downstream of the ramp. Benefits to the Great Lakes fishery far outweigh the potential adverse impacts of construction and presence of the structure.

Due to the nature of the project and site specific conditions, construction within the waterway and floodplain was minimized to the extent practicable and could not completely be avoided. An evaluation according to the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230) has been prepared because there will be a discharge of fill material in waters of the U.S. associated with the proposed action. The Section (404)(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act." A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction activities.

Review of the proposed action for fish passage at the Frankenmuth Dam, and comments received during public review indicate that the proposed action does not constitute a major Federal action significantly affecting the human environment; therefore, an Environmental Impact Statement (EIS) will not be prepared.

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Figure 10: Existing and proposed rock ramp profile.

B. Section 404(b)(1) Evaluation Pursuant to the Clean Water Act

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1.0 NEED AND PURPOSE FOR THE PROPOSED PROJECT

1.1 The U.S. Army Corps of Engineers, Detroit District (USACE), proposes construction of a fish passage at the Frankenmuth Dam. The Frankenmuth Dam is located on the Cass River in the City of Frankenmuth (City), Saginaw County, Michigan and is part of the Saginaw Bay Watershed (Figures 1, 2 and 3). The Frankenmuth Dam prevents several desirable fish species, particularly walleye but also including suckers and lake sturgeon, from accessing historically available spawning and juvenile rearing habitat located upstream in the Cass River and in Cass River tributaries.

1.2 The goals of this project are to restore the walleye population to be largely self-sustained through natural production, and to increase the wild fish to hatchery fish ratio in Saginaw Bay through reconnection of the habitat. Fish passage beyond the Frankenmuth Dam is needed to allow desirable fish species that currently are denied upstream movement access to historically significant spawning and juvenile rearing areas. Access to approximately 73 miles or 460 acres of river habitat (approximately 25 miles of the main branch of the Cass River), up to the Caro Dam, would be restored if passage is provided at Frankenmuth. The Saginaw Bay watershed represents the largest historic breeding ground for many fish species in Saginaw Bay and Lake Huron. The lack of fish passage along major rivers and river tributaries, such as the Cass River at Frankenmuth, significantly contributes to a decline in fish populations in the Great Lakes. A fish passage project at the Frankenmuth Dam would benefit the overall biodiversity of the Cass River and the Saginaw Bay watersheds, and in particular walleye recovery. Walleye is a Michigan Department of Natural Resources (DNR) target species for recovery in the watershed, as it is most affected by loss of reproductive habitat. Walleye spawn in gravel and cobble areas, many of which are in tributaries blocked by dams. Passage for desirable fish species, such as walleye, would provide both ecological and economic benefits to the area.

2.0 PROJECT AUTHORIZATION

2.1 Section 506 (Great Lakes Fishery and Ecosystem Restoration) of the Water Resources Development Act (WRDA) of 2000 (42 U.S.C. 1962d-22[c], PL 106-541), as amended, states in paragraph (c)(2): “The Secretary shall plan, design, and construct projects to support the restoration of fishery, ecosystem, and beneficial uses of the Great Lakes.” This project is being conducted under that authority in cooperation with other Federal, State, and local agencies, including the Michigan DNR and the Partnership for the Saginaw Bay Watershed.

2.2 This Environmental Assessment (EA) is written pursuant to the National Environmental Policy Act (NEPA) of 1969. Pursuant to the Clean Water Act (CWA), a Section 404 (b)(1) Evaluation of the environmental effects of the discharge of fill material into waters of the United States has been prepared (Attachment B). The Section 404(b)(1) Evaluation concludes with the determination that “the proposed action is in compliance with Section 404 of the Clean Water Act.” A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction.

3.0 SITE DESCRIPTION

3.1 Region. The project area is in the vicinity of the Frankenmuth Dam on the Cass River in the City of Frankenmuth, Saginaw County, Michigan, approximately 20 miles south of the Saginaw Bay. The region is part of the Saginaw Bay watershed. The Cass River watershed encompasses approximately 908 square miles of the Saginaw Bay watershed. The Cass River begins in Tuscola County east of the site, flows west-southwest approximately 80 miles into the Saginaw River, and then flows into the Saginaw Bay and Lake Huron (Figure 4).

3.2 Frankenmuth was settled by German immigrants in 1845 and is known by the nickname "Little Bavaria." The immediate surrounding area was originally developed as farmland, with trade and craft establishments developed in town. Frankenmuth established a reputation for flour mills, wool mills, and production of beer, cheese, and sausage. The construction of I-75 in the 1950's provided easy access to the area. Today, tourism drives the local economy. Over three million tourists visit Frankenmuth's Bavarian-themed shops, restaurants and hotels annually. The town hosts numerous festivals and events throughout the year both downtown and in Heritage Park along the Cass River. Commercial and recreational boaters utilize the Cass River both up and downstream of the Frankenmuth Dam. Residential and commercial properties are concentrated in downtown Frankenmuth. The 2008 census estimates the population at approximately 4,650 people.

3.3 Project Site. The project site includes the shallow-waters and banks of the Cass River and City owned land located in the vicinity and downstream of the existing Frankenmuth Dam (Figures 3, 5 and 6). A 2004 Michigan Department of Environmental Quality (DEQ) inspection report lists the dam (originally constructed in approximately 1850) in fair condition. The riverbed is comprised of mainly gravel / sand and cobble with some silt. The banks of the Cass River in the area of the dam and proposed rock ramp are mostly grass with some stone reinforcement. The City of Frankenmuth constructed a dike along the Cass River in downtown Frankenmuth in the 1950's. The USACE has also performed various improvements along the Cass River at Frankenmuth as part of a flood management and protection project. A concrete floodwall along the northern bank of the Cass River and riprap scour protection along the southern bank upstream of the dam were constructed in 1966. In 1967, riprap was installed downstream of the dam, along the northern bank. Improvements at a nearby pump station were performed in 1971. In total, features of the flood management project are approximately 3,700 linear feet. No other federal projects currently exist in Frankenmuth.

3.4 The riverbanks are relatively steep along both sides of the project site. Part way up the northern bank is a paved, river-walk and USACE flood control project dike. A reproduction of an early mill is located on the northern bank near the dam. The City's water main crosses the Cass River approximately 200 feet upstream of the dam. A City wastewater treatment plant facility is located on the southern bank, with an outfall pipe into the river located approximately 500 feet downstream of the dam.

3.5 Hydrology. The Cass River watershed runs across Huron, Sanilac, Tuscola, Lapeer, Genesee and Saginaw counties, and joins the Saginaw River near Saginaw, Michigan (Figure 4). The drainage area of the Cass River is approximately 908 square miles. Approximately 60% of

the total land area within the watershed is agricultural and approximately 20% is woodland. Remaining land area is miscellaneous (e.g. developed, mixed use, wetlands, etc.). Soils in the region are mostly loamy, silty clays and sands, and are poorly drained. The annual mean discharge of the Cass River at Frankenmuth (1908-2009) is estimated to be 600 cubic feet per second (cfs), and during the spring spawning period of March through May the monthly mean flow (1908-2009) is approximately 1,200 cfs. The river flow has been altered at the dam since its construction in approximately 1850.

3.6 Cultural Resources. A review of the National Register of Historic Places, available photographs, maps and drawings; and discussions with the Frankenmuth Historical Society were carried out in an attempt to identify whether any cultural resources may be impacted by the proposed fish passage. The nearby, existing mill structure is a reproduction of an early mill. Per Mary Nuechterlein of the Frankenmuth Historical Society, blueprints for the existing reproduction mill are dated 1982-1984. The original mill was torn down in 1954/55. The original Frankenmuth Dam was constructed of earth and stone in 1848. It was later converted to a wooden structure, and then to a concrete structure. There has been periodic maintenance and patch work done in past decades and more recently in 1995, and then again in 2002. The dam no longer retains historical integrity. The nearby reproduction of an early mill and the existing Frankenmuth dam are not considered historic properties under 30 CFR 800.4. No historic properties are located in the area of potential effect of the project.

3.7 Fishery. The Cass River supports many diverse fish species including: bass (largemouth, rock, smallmouth, white), black bullhead, bluegill, catfish, carp, freshwater drum, northern pike, suckers (redhorse, white), and walleye. Recreational fishing is a thriving activity across the watershed. A number of fish that live most of their adult lives in the Saginaw Bay and Lake Huron utilize the Cass River for spawning and juvenile rearing. The Cass River and its tributaries upstream of Frankenmuth provide extensive and historically significant spawning and juvenile rearing habitat for multiple fish species including walleye, suckers, and lake sturgeon. Current areas of the Cass River available to walleye (fish species targeted for recovery) provide little preferable habitat and the Frankenmuth Dam prevents fish from traveling upstream to spawn.

3.8 The walleye (*Sander vitreus*) population in Saginaw Bay was historically among the largest in the Great Lakes, second only to that of Lake Erie. Based on communications with Mr. James Baker, DNR Fisheries Division, District Fisheries Biologist, the walleye population collapsed in the mid-1940's due to a series of year class failures brought on by a combination of commercial over-fishing, pollution, and an influx of invasive species including alewife and rainbow smelt. To restore recreational fishery opportunities in Saginaw Bay, the DNR built walleye rearing ponds for raising young of the year walleyes during the 1970's and 1980's. The recreational fishery for walleyes expanded greatly, and the collapse of alewife in Lake Huron in 2003 as a result of a major food web shift brought about by zebra and quagga mussel colonization allowed the accumulated walleye stock to begin reproducing naturally. The Saginaw Bay walleye population is self-sustaining at present, but a resurgence of alewives could shift the balance in the other direction very rapidly, as alewives are voracious predators on newly hatched walleye fry.

3.9 Walleye spawn in the spring, generally March and April. They spawn in rocky, gravelly areas that receive a substantial amount of water movement (typically a river), which oxygenates the eggs and keeps silt from covering them. To aid in recovery and population stability, walleye need passage beyond existing dams to access high quality spawning and juvenile rearing habitat with appropriate spawning substrates. A report, *Enhancing Fish Passage over Low-head Barrier Dams in the Saginaw River Watershed*, was prepared in December 2005 for the Partnership for the Saginaw Bay Watershed. The report concludes, providing fish passage over structures offers a major opportunity for restoration of certain Great Lakes fish populations that have historically relied upon rivers for spawning and juvenile rearing areas. The majority of natural reproduction for walleye occurs in rivers. A critical factor to walleye recovery in Saginaw Bay is blocked access to spawning and juvenile rearing areas upstream of dams.

3.10 The *Michigan Department of Natural Resources Saginaw Bay Walleye Recovery Plan* (Fielder and Baker 2004) is a blueprint for management actions intended to achieve a self-sustaining walleye population through natural reproduction and restoration of ecological balance. To address recruitment limitation from lack of inland reproduction, 20 dams out of approximately 315 within the Saginaw Bay watershed were identified as candidates for either removal or fish passage. The Cass River, Frankenmuth Dam and Shiawassee River, Chesaning Dam were two of six key sites the Recovery Plan identified for fish passage to achieve successful restoration of the walleye fishery in Saginaw Bay and Lake Huron. A low-slope rock ramp with boulder arch weirs was constructed at the Chesaning Dam site during summer 2009, restoring fish passage to approximately 37 river miles of upstream habitat historically available to target aquatic species in the Saginaw River Watershed. Walleye, smallmouth bass and suckers were found using the ramp habitat.

3.11 The invasive sea lamprey (*Petromyzon marinus*) also resides in the Great Lakes, including Lake Huron and the Saginaw Bay. Adult sea lampreys swim upstream into Great Lake tributaries, including the Cass River, to spawn. The Frankenmuth Dam impedes sea lamprey from traveling upstream to spawn, but spring high water levels allows for some passage. The U.S. Fish and Wildlife Service (FWS) is aware of these intermittent dam breeches and conducts periodic monitoring. Monitoring conducted by the FWS indicates that there is limited sea lamprey habitat upstream of the dam and that there is presence of most larval age classes upstream. The FWS Sea Lamprey Management Program, out of the Marquette, Michigan Biological Station, develops and implements measures to maintain sea lamprey abundance at or below acceptable levels in the Great Lakes. As part of the program, the Cass River upstream of the Frankenmuth Dam is being treated with lampricide to control larval sea lamprey. The FWS is expected to continue lamprey control (use of lampricides or traps) on the Cass River.

3.12 Wildlife. Frankenmuth and the project site are developed areas with wildlife typical of urban environments. Typical wildlife includes: deer, rabbit, squirrel, fox, woodchuck, raccoon, skunk, and various species of amphibians, reptiles and insects. Multiple species of birds also inhabit the area and typically include mallard, wood duck, pheasant, ruffed grouse, egret, Canada geese, owl and robin.

3.13 Vegetation. Frankenmuth in the vicinity of the project site is largely parkland. The banks of the Cass River in the area of the dam and proposed rock ramp are mostly grass with various landscaping. Trees are present along the upper portion of the southern bank, and along both banks in the foot area of the proposed rock ramp, and near the proposed access road area (Figure 3).

3.14 Federally Listed Species. The USACE reviewed the FWS County Distribution of Federally Listed Threatened, Endangered, Proposed and Candidate Species (revised August 2011) for Saginaw County, Michigan. The County Distribution includes the following listings:

- Indiana bat (*Myotis sodalis*) - endangered;
- Eastern massasauga rattlesnake (*Sistrurus catenatus*) - candidate species; and
- Eastern prairie fringed orchid (*Plantathera leucophaea*) - threatened.

Habitat for the eastern massasauga rattlesnake (wet areas including wet parries, marshes and low areas along rivers and lakes) and eastern prairie fringed orchid (wide variety from mesic prairie to wetlands; requiring full sun with a grassy habitat with little or no woody encroachment) is not present at the project site for the fish passage structure or proposed access road. Based on a review of this information and knowledge about the project site, the Corps has determined that the proposed activities would have *no effect* on the eastern massasauga rattlesnake and eastern prairie fringed orchid.

Indiana bat (*Myotis sodalis*) is listed as endangered with summer habitat including “small to medium river and stream corridors with well developed riparian woods; woodlots within 1 to 3 miles of small to medium rivers and streams; and upland forests. Caves and mines as hibernacula.” Trees are not present at the location of the proposed fish passage structure within the river. Some trees are present along the river in the vicinity of the proposed access road (Figure 3). Indiana bats roost during their active period, or summer season, under loose tree bark, and occasionally in very large cracks, on dead or dying trees. They also forage in or along the edges of forested areas. Although the trees at the project site could potentially provide Indiana bats summer foraging, they are not known to be preferred habitat or unique to the area. Data indicate that the Indiana bat is widespread in southern lower Michigan. Frankenmuth is located near the northern boundary of the habitat range, and the Indiana bat has not been documented this far north on the eastern side of the state.

3.15 Wetlands. The site of the proposed rock ramp encompasses the riverbed and riverbanks immediately downstream of the Frankenmuth Dam. There are no wetlands at the proposed project site.

3.16 Coastal Zone Management. The proposed project site is outside of the Coastal Zone Management Boundary as defined by the Michigan Department of Environmental Quality (DEQ) Coastal Management Program.

3.17 Water and Sediment Quality. The water quality of the Cass River near Frankenmuth is considered good to fair. Water has some turbidity and nutrients as a result of urban runoff, agriculture runoff and bank erosion. There is no heavy industry in the vicinity of the subject site.

The river supports a variety of aquatic life and related activities such as fishing – which is an indicator of good water quality. A 2006 report by the DEQ titled, *Biological Survey of the Cass River Watershed and Selected Tributaries in Saginaw, Tuscola, and Sanilac Counties, Michigan, June 26-July 11, 2006*, states that all stations surveyed along the main branch of the Cass River contained “macroinvertebrate communities that were rated acceptable to excellent” and were “supported by in-stream habitats that were generally considered as good.” The Cass River was sampled again in 2011 by the DEQ; however, no sites were sampled near Frankenmuth (up or downstream). The 2011 sampling event report has not yet been completed, but per DEQ, they do not expect any major changes to the overall condition of the Cass River in the reach near Frankenmuth, as compared to conditions noted in the 2006 report. Based on visual observations and surveys, the river bottom in the project area is mainly gravel and cobble. No extensive amount of sediment is known to be present behind the dam, and the potential for contaminated sediments (if present) is low due to the non-industrial nature of the area and hydrology of the Cass River.

3.18 Air Quality. The EPA and DEQ monitor ambient air quality across the State of Michigan. Data indicates that Saginaw County is currently in attainment for National Air Quality Standards and air quality in the area of Frankenmuth is typically considered “good”.

3.19 Hazardous, Toxic and Radiological Wastes (HTRW). There are no known hazardous, toxic or radiological wastes at the proposed site of the fish passage or in the immediate vicinity. Refer to paragraph 5.19 of this report for additional details related to a subsurface investigation at the nearby former landfill located on City owned property.

3.20 Recreation. The Cass River is a major attraction in Frankenmuth and is utilized for numerous recreational and leisure activities. Popular activities include: fishing, canoeing, kayaking, wildlife viewing, and commercial boating/riverboat cruises. Due to Frankenmuth’s heavy reliance on tourism, including several river boat cruises that currently operate upstream of the dam, the City desires pool levels above the dam be maintained.

3.21 Noise, Aesthetic Quality and Traffic. Noise within the vicinity of the project site is typical of that found in an urban parkland and small downtown city. The aesthetic quality of the area resembles quaint riverine habitat located in a small historic town. Foot traffic follows a pathway along the top of the northern bank just downstream of the dam. A City side street runs beyond the northern bank. A neighborhood road dead-ends at the river on the south side of the river, near the dam. Boat traffic is restricted at the project site due to presence of the dam, which has been at its present location since approximately 1850. River boat cruises utilize the river upstream of the dam, and recreational boaters utilize the river up and downstream of the dam.

3.22 Maintenance. The City maintains the riverbank along the proposed rock ramp site. Maintenance activities involve landscaping, erosion control, and the pedestrian walkway.

4.0 ALTERNATIVES AND THE PROPOSED ACTION

4.1 Alternatives. The proposed action is construction of a fish passage at the Frankenmuth Dam located on the Cass River in Frankenmuth, Michigan (Figures 2-6). All action alternatives

listed below (Alternatives 1-4) would incorporate space for portable sea lamprey trap features in their designs to allow capture and / or monitoring of sea lamprey populations. Depending on the final fish passage design and proposed access roads to the river for construction, action alternatives are anticipated to include some disturbances along the river banks. Project alternatives considered include:

- Alternative 1 - Fish Bypass Channel,
- Alternative 2 - Rock Ramp,
- Alternative 3 - Spiral Fish Ladder,
- Alternative 4 - Dam Removal, and
- Alternative 5 - No Federal Action.

Alternative 1: A fish bypass channel simulates existing river conditions to encourage desirable fish species to utilize a constructed, natural-like channel to bypass an obstruction. An advantage of a fish bypass channel is that once constructed and discovered by fish, it is an easy way for most fish species to bypass an obstruction. In addition, riffle and pool habitat could be incorporated in the design to provide additional habitat for invertebrates and some spawning fish. A control structure is typically necessary in order to respond to headwater (flow) fluctuations and provide several velocities. However, turbulence becomes a greater issue as head difference above and below the riverine obstruction increases. Disadvantages of a fish bypass include the required amount of property / land along the river to construct, extensive design to meet required flows, challenges to attracting fish to the channel, controlling erosion / sedimentation, managing earthwork and proximity to utilities and building structures. Maintenance of flow and sediment transport may also be required indefinitely. Construction of a fish bypass channel was not pursued due to space limitations along the riverbanks at the project site, the required long-term operation and maintenance, potential issues in attracting fish to the bypass openings, and cost.

Alternative 2: Construction of a rock ramp in the Cass River to allow fish to pass the dam. Fill and rock material would be placed starting approximately 350 feet downstream of the Frankenmuth Dam, creating rock weirs and resting pools along a gradual slope (2 to 5%) up to and encompassing the existing dam's footprint. Advantages of a rock ramp include that it is: constructed of natural material; it can add structural support to the dam; it provides variable flow around the rock material to allow fish of various types and sizes to navigate the ramp; it can be readily incorporated into the existing area; it requires little maintenance; and it is unencumbered by the proximity of utilities or buildings. Although placement of material would change the riverbed at this location, it would also provide riffle and pool spawning and permanent habitat for various river dwelling organisms at the site. Challenges include large and varied amount of rock material required and design needs to ensure slope and water velocities match requirements for the target fish species. Construction of a rock ramp is the proposed alternative because it will be the most effective at passing fish, would not have attraction issues that a fish bypass channel or spiral fish ladder would have, would be the most natural and aesthetically pleasing alternative, and most acceptable to the City. Fish are typically attracted to a fish passage based on

water velocity. The proposed rock ramp design extends across the entire width of the river, thus the velocity is relatively similar across the entire river. A bypass channel or a fish ladder has a particular sized opening that is less than the width of the river, and in the case of a bypass channel at this dam, it would need to be located some distance downstream of a barrier. If sufficient flows from the base of a bypass channel or fish ladder are not detected by fish, they are not attracted to the opening and thus would not use the passage.

Alternative 3: Installation of fish ladder structure(s) in or next to the river to allow fish to pass the dam. For example, a spiral fish ladder is an open-top, circular structure with baffles spaced in an alternating pattern at periodic intervals. The gradient of the pathway increases as organisms travel up the spiral. As fish swim the pathway through the structure, they swim up a low-grade slope until reaching a water level matching that above the dam, allowing upstream movement over and beyond the dam. Advantages to fish ladders are that they can be designed to allow specific species with specific swimming abilities to pass a dam, with baffles providing resting areas. Disadvantages include design complexities to meet requirements for non-jumping fish (walleye), challenges to maintain necessary flow conditions for target species, high mortality rate for small fish species, and required excavation (either in stream or riverbank) and / or potential alteration or partial demolition of the dam (if placed in stream) for installation. Structural concerns have been noted with this type of passage. Ladders are often more difficult to modify when flow conditions change, are less aesthetically pleasing, and have displayed variable results for efficiency at similar locations in the Saginaw Bay watershed. Loose material and stones can block the flow-through slots and thus block fish passage. In addition, there are challenges to attracting fish to the structure opening. A spiral fish ladder was not pursued due to operating costs, needed maintenance to maintain flow conditions, potential mortality rate for small fish species, and potential issues in attracting fish to the fish ladder openings.

Alternative 4: Removal of the dam to allow fish passage. Removal of the dam would help reestablish historic water flow and sediment transport conditions in the Cass River. This would redistribute materials to create a more natural river bottom, providing habitat and biotic diversity. Aquatic species and recreational users of the river would have free access to travel up and downstream at this location. A key disadvantage includes potential sediment transport issues, as the existing dam has been in place since approximately 1850 and extensive knowledge of sediment conditions upstream of the dam is lacking. In addition, the City has expressed explicit desire to maintain the upstream pool elevation for tourism value, which would be eliminated by removal of the dam. The upstream reservoir may also be a benefit to some species. Dam removal was not acceptable to the City and was not pursued.

Alternative 5: No federal action. Based on the 2004 DEQ inspection report, the dam is in fair condition and there are no apparent structural deficiencies that may lead to the immediate failure of the dam. It is likely that the dam would continue to be

maintained for the foreseeable future. No action keeps the Cass River watershed segregated, continuing to negatively impact the region's ecology and fishery. The no federal action alternative was not pursued because it would result in continued restricted fish access to desirable spawning and juvenile rearing areas.

4.2 Description of Proposed Action. The proposed action is Alternative 2, construction of a rock ramp fish passage (Figures 9 and 10). Clean rock and other suitable inert material would be placed starting approximately 350 feet downstream of the dam, creating rock weirs and resting pools along a gradual slope up to and encompassing the existing dam. Preliminary design indicates an approximate 2.9% slope of the overall structure. Slopes of pools and weirs would vary slightly to meet sustainable and burst swimming abilities for fish targeted in this project. In order to meet design requirements of the proposed rock ramp, material may be placed upstream of the existing dam and in close proximity to the existing dam's footprint (within approximately 50 feet upstream from the base of the dam). Some alteration of the Frankenmuth Dam, such as grouting, partial dam demolition (e.g., cap of dam / approximately top 4' feet), toe stone replenishment or reinforcement may be required to facilitate placement of the rock ramp. At the top of the rock ramp, fish would be able to navigate over the dam. Material would be placed at varied locations across the entire width of the Cass River for the full extent of the rock ramp. Varied placement of material would provide multiple flow velocities around the rocks and boulders allowing movement for walleye and various other fish species. A rock ramp would incorporate naturalistic features to create riffle and pool habitat (refer to cover page image and Figure 7). The footprint of a rock ramp at this location is unencumbered by the proximity of utilities or buildings and is not anticipated to require excavation into the stream bank or placement of an artificial looking structure as the fish bypass channel and spiral fish ladder alternatives would. Placement of any upstream material (e.g., vanes or cofferdam) would be coordinated with the City of Frankenmuth to ensure protection of the upstream water main.

4.3 Construction Sequence. It is anticipated that construction of the proposed rock ramp could be accomplished from either side of the riverbank depending on the type of equipment utilized. Since the riverbank is mostly open, no extensive clearing of vegetation would be necessary in the area of the ramp. Cutting of trees in the project area (specifically large trees in the vicinity of the proposed access road) will be restricted to outside the Indiana bat active period of April 1 to October 31, unless a survey is conducted to determine that no bats or preferred, suitable habitat exists in the project area. A permanent access road leading down to the riverbank and along the length of the proposed rock ramp is proposed to be constructed along the southern bank. The majority of the road will be on an existing, flat, former road-bed area with overgrown brush. The existing dam would not be removed, though it will be modified. The design phase will determine the appropriate sequencing and coordination for ramp construction and alterations and / or partial demolition to the dam. Construction would likely occur in the late summer or early fall when stream flows are lower, as to minimize impacts and risks from high spring and fall water flows. In-stream work would be avoided for the period of March 15 to May 31 to minimize negative effect on several spawning fish species in the area. Special care will be taken to avoid the overhead utility wires currently located near the dam. Disturbances to in-river bottom materials would be minimized to the extent practical. Minimal in-stream and bank excavation is anticipated as part of equipment access into the river and for construction of the proposed ramp and vanes. The vanes are stone structures used to prevent shoreline erosion and

to redirect river flow energy back toward the center of the river. Some variation from the project as described may occur with respect to the sequence of activities, method of operation, or design details as a result of unanticipated design improvements, site conditions, or cost-saving measures. Such variations would not result in significant changes to either the overall project design or environmental impact, without further evaluation under the NEPA.

4.4 A temporary cofferdam may be required as part of construction for the purpose of maintaining the structural integrity of the dam and in-stream safety during installation of the rock ramp. More detail as to whether a cofferdam is needed will be determined during the design phase, project sequencing and using any additional data obtained (e.g., geotechnical coring at the dam). If needed, the temporary cofferdam would likely be constructed of inert material (e.g., stone with an impermeable membrane or steel sheet pile). Once sufficient downstream material has been placed to ensure the stability of the dam, the upstream cofferdam could be removed and materials reused for the rock ramp, or incorporated into the upper end of the rock ramp structure. The height of the temporary cofferdam would roughly match the height of the existing dam, with some adjustment to make sure any required flows will still be met. It would extend the width of the river and be approximately 8 feet tall, with a top elevation matching that of the existing dam; side slopes would be approximately 2H:1V resulting in a base approximately 36 feet wide. The temporary cofferdam would be located approximately 100 feet upstream of the existing dam. Based on the current design plans, potential impacts from a temporary cofferdam are expected to be similar to that from placement of the proposed rock ramp because they would be constructed of similar rock and stone materials and placement of those materials would occur in the same general area of the river. Impacts from a temporary cofferdam would be minor, short-term and anticipated to include altering the benthic habitat within the footprint of the cofferdam and temporary displacing and disrupting fish and other in-stream organisms during construction. Temporary noise and minor turbidity would be expected in the immediate area of the proposed construction. No significant aquatic habitat is known to exist at or immediately upstream of the Frankenmuth Dam. Similar to the proposed rock ramp, in-stream materials associated with a cofferdam could provide new benthic habitat. At this point in time, no significant adverse effects from installing a temporary cofferdam are expected. The USACE is in the process of evaluating additional information to ascertain if significant negative impacts on the human health or the environment would occur from installing the temporary cofferdam. If potential significant adverse impacts are identified; additional coordination under NEPA would occur as appropriate.

4.5 Design Elements. A rock ramp is designed to replicate natural rapids in appearance and function. Refer to cover page image and Figure 7 for a visual representation. The USACE utilized a Hydrologic Engineering Center River Analysis System (HEC-RES) hydraulic model to compare existing conditions to the proposed project conditions. Based on results of the HEC-RAS model, the proposed design meets the recommended criteria for walleye passage and would also allow passage of other warm and cool water fish species in this area. The structure would be designed to withstand a 1% chance (or 100 year) flood event and typical winter ice conditions. Refer to paragraph 5.4 below for information related to the affected environment, and to Appendix B, Hydraulic and Hydrology Analysis, of the main Detailed Project Report (DPR) for additional information.

4.6 Weir spacing would typically range from 20 to 30 feet, with pools being an average of

approximately 22 feet wide. Measurements are approximate and depend on location within the river (right vs. left side of river) and along the ramp (top vs. bottom of ramp). There would be an approximately 0.7 foot drop in elevation between most weirs, with a smaller drop for the top weirs. The ramp would contain step / pool weir structures arranged in a shallow V-shape with the point of the “V” facing upstream (**Figures 3 and 7-9**). This shape would provide stability to the rapids by directing flow towards middle-channel, reducing near-bank erosion and stress. Permanent erosion control (i.e., rip-rap) is anticipated at select areas along the banks of the ramp and modified erosion control would be installed as needed. Five straight vanes are to be incorporated for bank and structure stabilization and to help focus flows. Two vanes would be located upstream of the ramp between the ramp and Main Street along the south side of the riverbank, two in the vicinity of the ramp (one on each side of the river) and one downstream of the ramp along the north side of the riverbank near the downstream end of existing rip-rap bank protection (**Figures 3 and 8**). To ensure adequate flow for migrating fish during low-flow periods, the ramp and weir structures would be arranged with a channel(s) within the ramp cross-section to allow for a suitable depth of flow for fish passage. Pool depths would range between 2 to 4 feet during spring fish runs. The material for the ramp would be a mixture of clean fill, gravel, sand and various sized stone, rock, boulders and other suitable inert from a USACE approved source. The rock ramp design includes space for two portable sea lamprey traps within the river channel near the dam. A permanent access road would be constructed along the southern riverbank, and extend from near the dam to approximately 1,300 feet downstream. Refer to EA cover page for a photo simulation of what the proposed rock ramp may look like once constructed (conceptual design illustration by Wade Trim).

4.7 Miscellaneous Project Details. The proposed action may require temporary access, staging areas, and / or construction of one or more temporary structures, upland or in-water. Temporary structures / staging sites would be at USACE approved, and City owned or approved locations. Temporary access for construction and staging could be on either side of the riverbank. Temporary structures / staging sites would be located outside of any wetlands, areas containing federally protected species and their critical habitat, and properties listed on or eligible for listing on the National Register of Historic Places. The type and location of temporary structures and / or staging sites cannot be determined at this time, since they would be incidental to the work being performed. Examples include turnarounds, work and storage areas, access roads, and office facilities. These construction aids would be within project boundaries or right-of-ways and removed when no longer needed.

4.8 Temporary activities would include appropriate precautionary measures to prevent erosion and sedimentation or other undesirable environmental impacts. The contractor shall prepare and / or obtain any required erosion and sediment control plans and permits. Soil erosion control methods would be put in place prior to beginning construction activities to minimize bank sediments from entering the river system. Depending on the type of equipment utilized, a temporary, stone road (or similar) may be constructed to and / or along the riverbanks for traction and erosion control. Other erosion control measures such as the use of silt fencing, straw bales, geo-fabrics, hydroseeding, or various other immediate re-vegetation tactics would be developed and implemented prior to, during and after construction, as needed. Any disturbed areas or temporary construction sites would be re-vegetated to similar conditions for long-term erosion control, or restored as applicable, upon project completion.

4.9 Operation and Maintenance (O&M). An O&M manual would be developed by the USACE to provide guidelines for typical operation and maintenance of the rock ramp. In-kind, in-place O&M activities would occur periodically following completion of the action. Maintenance would include activities such as debris removal and modifications to the placement and sequence of boulders, rocks and associated riffles. Refer to paragraph 5.23 below for additional information related to the potential environmental effects of maintenance associated with the proposed action.

5.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

5.1 Impact Summary. This section identifies and analyzes the type and magnitude of anticipated environmental impacts associated with the proposed action. Effects are minor and temporary and would include: short-term noise, air emissions and traffic from construction equipment operation; temporary, minor turbidity during construction activities; temporary displacement of fish and wildlife during construction; destruction of bottom dwelling organisms in the immediate work area; removal of trees at the access road area; and possible increased passage of the sea lamprey. Fish and wildlife would return upon completion of construction, and the area eventually would re-colonize with bottom dwelling organisms from adjacent areas. Disturbed areas would be re-vegetated. Although additional lamprey may pass as a result of the proposed action, their numbers would not likely increase due to lack of preferred lamprey habitat upstream of the dam and control methods (i.e., use of lampricides or traps) by the FWS. Existing USACE flood management projects in the area would not be negatively impacted by construction of the rock ramp. No buildings or other structures would be impacted by the construction. This project would alter the stream at this location, and may require some seasonal maintenance, but no significant adverse impacts are expected. Restored access to historically available spawning and juvenile rearing habitat is a goal of the *Michigan Department of Natural Resources Saginaw Bay Walleye Recovery Plan* and would benefit the Great Lakes fishery. The benefits to the Great Lakes fishery far outweigh the presence of a new structure in the Cass River and temporary adverse impacts of the construction.

5.2 Region. Construction of the rock ramp would allow upstream passage of walleye and other desirable fish species to historically significant spawning and juvenile rearing areas. This expanded spawning and juvenile rearing habitat would benefit the overall Great Lakes fishery. Construction of the rock ramp would not have negative effects on the region.

5.3 Project Site. The construction and presence of the proposed rock ramp is not anticipated to cause significant effects to the existing dam or the City. The rock ramp would provide a smooth transition from the natural stream to the existing dam (refer to cover page image and Figure 7). The proposed rock ramp would occupy shallow-waters of the Cass River and riverbanks (Figures 3 and 5-6 for the proposed location of the rock ramp) in the vicinity of and just downstream of the Frankenmuth Dam. In order to meet design requirements of the proposed rock ramp, material may be placed upstream of the existing dam and in close proximity to the existing dam's footprint (within approximately 50 feet upstream from the base of the dam). See Paragraph 4.4 regarding the potential need to install a temporary cofferdam upstream of the dam for the purpose of maintaining the structural integrity of the dam during construction of the

proposed rock ramp. Partial dam removal would be required and the rock ramp structure will be constructed overtop the existing dam base; however, river water level elevations in the area would remain similar and no significant drop in the upstream pool elevations is anticipated. Impacts would be localized to the immediate vicinity of the rock ramp. Flood management structures near the project site would not be negatively impacted by the project. Partial covering of existing riprap along the riverbank by the proposed rock ramp would not compromise erosion control, as additional stream bank stabilization would be installed as necessary. Multiple straight vanes may be incorporated for bank and structure stabilization.

5.4 Hydrology. Hydraulic and hydrology (H&H) analyses were conducted as part of an evaluation of existing conditions and the alternatives described above. H&H information resulting from the HEC-RAS modeling is discussed in the H&H appendix of the DPR report. The H&H study of the proposed design criteria supports a rock ramp structure as a suitable option for providing conditions to allow fish passage for walleye and other similar species on the Cass River at Frankenmuth. The study indicates that criteria for spring spawning and migration flows would be met and that there would be no significant increase in the 1% chance event (100-year) flood elevations when compared to current conditions. Under existing conditions, some areas are currently inundated by the 1% chance flood event. No structures would be impacted by the modeled changes in flood elevations. The proposed action does not create a harmful interference to life or property at this site. The proposed action complies with the Federal Executive Order 11988, Floodplain Management, because there is no practicable alternative to construction in the floodplain. The proposed project would not have a significant impact to the floodplain.

5.5 Cultural Resources. In compliance with Section 106 of the National Historic Preservation Act of 1996 and Executive Order 11593 (Protection and Enhancement of the Cultural Environment, May 1971), the National Register of Historic Places and the State Historic Preservation Office (SHPO) have been consulted. The project site has been reviewed for historic and cultural resources. No known historic properties listed on or eligible for listing on the National Register, or archeological sites / items are known to be located in the area of the proposed project site. Construction contracts would include clauses protective of any discovered cultural resources. If any unusual sites / items that may have historical value are encountered during the course of the proposed construction, work would stop and the sites / items would be protected while the appropriate authorities, including the District archeologist, are contacted. It is anticipated that the proposed action would not affect cultural resources.

5.6 Fishery. The rock ramp would significantly restore access to desirable upstream spawning and juvenile rearing habitat for the walleye, a DNR and Partnership for the Saginaw Bay Watershed target fish species. Similar rock ramp structures have been installed in Michigan (most recently during summer 2009 in Chesaning, Michigan), Minnesota, and Wisconsin. The ramp design would allow for fish passage back downstream over the dam and rock ramp towards the Saginaw Bay / Lake Huron. No negative impacts to desirable Cass River fish populations are anticipated as a result of implementing the proposed action. Access to upstream habitat would contribute to a long-term restoration of the native fishery in the Great Lakes. The project will also facilitate passage for a variety of other coolwater species including white bass, smallmouth bass, channel catfish, and white sucker. In addition, fish such as the lake sturgeon may spawn

directly in the rock ramp structure.

5.7 Bottom dwelling organisms and fish habitat would be expected in and among the gravel and riverbed material that make up the existing river bottom in the immediate area of the proposed construction. Although these habitats would likely be destroyed and / or altered during construction activities, no significant fish or wildlife habitat is known to occur at the site of these temporary effects. Some of the riverbed material may be buried with clean off-site rock, replaced, or incorporated within the proposed rock ramp. Benthic organisms such as arthropods and various insects would largely be disturbed or destroyed in the immediate work area, but would re-colonize the site upon completion of the project. The rock ramp would provide benthic habitat. Varied water velocity and increased cavities provided by the rock ramp would provide additional habitat for existing organisms. This would result in an increase in local invertebrate and fish diversity and positively impact the local ecology.

5.8 Construction-induced turbidity, mechanical disturbance, noise, and vibrations would result in temporary, low-level, adverse impacts on the local fish population. Most fish would avoid the work area until such effects are eliminated or conditions return to pre-project levels. Other free-swimming organisms would likely leave the area during construction activities. Significant mortalities would not be expected to occur. Loss of benthic organisms is expected to be insignificant due to the small area that could be affected by turbidity, in relation to the large surface area of the Cass River and similar habitat in the area. At this time, monitoring for success of the proposed action is anticipated to include annual fish counts for walleye and other fish species during the spawning season, above and below the dam, for approximately 3 to 10 years. Fish would be released after being counted and measured, thus monitoring is not anticipated to cause a significant impact to the fish.

5.9 A fish passage structure at the Frankenmuth Dam site would increase the possibility of sea lamprey movement above the dam; however, negative impacts from their passage are not anticipated. Because of the continued FWS control methods (i.e., use of lampricides or traps) on the Cass River above the dam, sea lamprey abundance would not increase significantly even with increased movement. The possible increase in sea lamprey passage is not anticipated to require additional management, treatment sessions or increase management costs due to limited sea lamprey habitat upstream of the dam. Integrated space for the FWS's proposed sea lamprey traps would provide sampling locations that could be used for fishery assessment and population monitoring of various species in the Cass River, including the sea lamprey. The traps would allow for removal of sea lamprey from the spawning population and provide scientific assessment opportunities. Traps would not affect walleye passage.

5.10 Since the proposed project at Frankenmuth is well upstream of the rivermouth of the Saginaw River, any aquatic nuisance species found in the Great Lakes that moves solely through the aquatic pathway must possess either: 1) self-propelled mobility or 2) the ability to "hitchhike" on other organisms to travel upstream. This eliminates organisms that rely on current for dispersal such as plants and algae. Ruffe (*Gymnocephalus cernuus*), threespine stickleback (*Gasterosteus aculeatus*), round goby (*Neogobius melanostomus*) and tubenose goby (*Proterorhinus marmoratus*) are invasive fish species that are found in Saginaw Bay and the Great Lakes. The ruffe, three spine stickleback, round goby and tubenose goby are associated

with river mouths and estuaries of large river systems. Literature from Europe and Russia indicate the ruffe and tubenose goby do inhabit upper river systems but no ruffe or tubenose goby have been collected locally in any upper Great Lakes river tributaries to date. Three spine stickleback have been collected in a very few upper river locations. The round goby has been found in small numbers in upper river systems across Michigan but this species is not anticipated to be a significant problem because the Cass River does not provide preferred habitat. In addition, coordination with the Michigan DNR in January 2012 indicates that the proposed action would not significantly change the distribution or impacts from *Viral hemorrhagic septicemia virus* (VHSV). No significant impact to or from invasive species are anticipated by implementing the proposed action.

5.11 Wildlife. Terrestrial wildlife in the project area may be temporarily disturbed during construction but no significant impacts are anticipated. Wildlife found in the immediate area would likely avoid the site during construction because of a possible increase in noise, turbidity and activity. Short-term impacts would be minor and may involve disrupted use of the adjacent upland bank area for resting or feeding by small mammals, reptiles, amphibians, insects, and birds. Terrestrial organisms are expected to return following completion of the project.

5.12 Vegetation near the site has adapted over time to the fluctuating and wet conditions of the floodplain, and has adapted to the influence of the existing dam. Since conditions of the pooling area upstream of the dam would be similar in the river once the proposed rock ramp fish passage is constructed, the vegetation should not suffer any adverse effects. Little, if any, woody riparian vegetation would need to be cleared in the area of the proposed rock ramp during construction, and any necessary clearing would be minimized to the extent possible. Riparian vegetation to be left standing would be protected from damage incident to clearing, grubbing, and construction activities by the erection of temporary barriers / fences. Construction of the permanent access road along the south riverbank would involve some vegetation clearing. The majority of the proposed access road would be located on an existing flat area and require clearing of mainly brush and small trees. The majority of larger trees located along the edge of the riverbank where it drops down to the river, or along the inside / landward side of the proposed road will be left in place. The proposed access road would be approximately 1,300 feet long and approximately 15 feet wide, totaling approximately 0.5 acres of vegetation clearing or disturbance. Trees and vegetation would remain upstream and downstream of the project site. Disturbed areas would be re-vegetated to minimize erosion. It is expected that the existing surrounding vegetation will naturally fill back in over time. No significant adverse impacts to the area's vegetation or ecosystem are expected.

5.13 Federally Listed Species. The proposed action was reviewed in accordance with the NEPA, Endangered Species Act (ESA) of 1973, as amended, and the Fish and Wildlife Coordination Act. The FWS "County Distribution of Federally-Listed Threatened, Endangered, Proposed and Candidate Species" (revised August 2011) for Saginaw County, Michigan has been reviewed; refer to paragraph 3.14 for additional details. Construction of the fish passage structure in the river would not encroach any woods or woodlots. Preferred habitat for listed endangered, threatened or candidate species is not present; therefore, the U.S. Army Corps of Engineers, Detroit District, has determined the construction at the site of the proposed project would have no effect on federally listed species and / or critical habitat at the site of the proposed

ramp. The USACE received a letter from the FWS on January 4, 2010, in which the FWS concurred with the USACE's determination that the proposed construction of a rock ramp would not have an effect on federally listed species and / or critical habitat. As the proposed action was further studied, potential excavation and vegetation clearing along the river and at the former landfill was included in the project. It was estimated that up to approximately 1.4 acres (700 by 90 feet) of trees may be removed along the riverbank in the area of the landfill (above the waterline). The Indiana bat may be present in the area; however, surveys have not been conducted to determine whether suitable nesting trees are present at this site. Cutting trees in the project area at the landfill will be restricted to outside the Indiana bat active period of April 1 to October 31, unless a survey is conducted and shows that suitable nesting trees are not present in the project site. Based on the type of habitat present, location of the site and proposed tree cutting period, the Detroit District, has made the determination that the project action involving tree removal at the landfill *may affect but is not likely to adversely affect* the federally listed species, Indiana bat. Additional communication and informal consultation with the FWS was conducted in fall 2011 and the USACE received a letter from the FWS dated January 13, 2012, in which the FWS concurred with the USACE's determination that the proposed tree removal along the landfill is not likely to adversely affect the Indiana bat.

5.14 Wetlands. No wetlands have been identified within the area to be affected by construction or in the immediate surrounding area; thus no impacts on wetlands are anticipated.

5.15 Coastal Zone Management. The proposed rock ramp fish passage would be constructed outside the Coastal Zone as defined by the DEQ, thus the proposed action would be "consistent to the maximum extent practicable" (as defined in 16 USC 1456, Coastal Zone Management Act, approved 1978) with the Michigan Coastal Zone Management Plan and not significantly impact the coastal zone.

5.16 Water and Sediment Quality. Construction and O&M activities would cause minor, temporary turbidity in the local area; however, since the river bottom in this area is primarily gravel, cobble and sand with few fines, the sediment suspension would be minimal and have a rapid resettlement rate. Construction induced increases in suspended solids and turbidity would be short-term. The adverse water quality impacts resulting from construction would be minor. Excavation activities would be limited and are anticipated to include an in-stream shallow excavation immediately downstream of the proposed ramp to create a resting pool for fish beginning the ascent (average depth approximately 2 feet) and bank excavations to place the headstones (large stone pieces) of the rock ramp weirs and straight vanes. The majority of access road construction would occur above the waterline with exception of a small cut and fill area (Figure 8). If during the design phase it is determined that a coffer dam is needed to maintain in-stream safety during construction and dam modification, it would be constructed of inert material (e.g., stone or steel sheet pile) and located approximately 100 feet upstream of the project. No extensive sediment accumulation known to be present behind the dam and no dredging activities are anticipated. If field conditions during construction show that extensive amounts of sediments are present and would be disturbed to a significant degree above natural conditions, a plan would be developed and evaluated to minimize sediment disturbance during construction activities. No significant adverse impacts from sediment disturbance or dispersal are anticipated. The constructed rock ramp is anticipated to increase water turbulence, thus

resulting in an increase in dissolved oxygen (DO) downstream of the ramp. Increased DO concentrations would be an added benefit to the river downstream of the rock ramp during low water, high temperature summer months; however, it is not considered a significant impact because low DO concentrations are not an issue in the vicinity of the project. Pursuant to the CWA, a Section 404 (b)(1) Evaluation of the environmental effects of the discharge of fill material into waters of the United States has been prepared (Attachment B of the EA). The Section 404(b)(1) Evaluation concludes with the determination that “the proposed action is in compliance with Section 404 of the Clean Water Act.” A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction.

5.17 The proposed construction may occur from either riverbank and from in the water using land-based construction equipment. Activities are not anticipated to significantly impact the water quality. Equipment to be used for construction would come to the site with new or sound hydraulic hoses and connections to minimize risk of leaks. Hoses and connections would be inspected daily at minimum, and equipment would be removed from service if a leak is detected. Equipment would be stored and fueled in designated locations approved by the USACE to minimize any potential leaks or spills from entering the river. Minor petroleum / chemical seepage from the land-based equipment may occur during construction activities, but it is not expected to result in any significant effects to water quality. The duration of in-stream work would be minimized as much as possible. In addition, related materials from the construction would be removed from the project site unless utilized during construction activities.

5.18 Air Quality. Impacts on air quality would arise from emissions of motorized equipment associated with the delivery of construction materials and construction activities related the proposed action, such as dust. Any impacts would be short-term and minor. All equipment would be required to meet emission standards. Emissions from the proposed action are exempted as *de minimis* (Latin for ‘of minimal importance’), and therefore meet the General Conformity Criteria pursuant to Section 107 of the Clean Air Act of 1970, as amended, and 40 CFR 93.153, Determining Conformity of Federal Actions. Dust reduction measures, such as spraying water, may be implemented as the need arises. The Contractor would be required to keep dust at a minimum and in compliance with air quality rules during construction. Once construction activities are complete, the proposed project would not produce air emissions.

5.19 Hazardous, Toxic and Radiological Wastes (HTRW). A review of the EPA’s EnviroMapper data, which includes Superfund sites, toxic releases, water dischargers, air emissions, and hazardous wastes, indicates that no HTRW sites are known to be in the area or would be impacted by construction of the proposed rock ramp. A search for contaminated sites (as defined under the Michigan Natural Resources and Environmental Protection Act 451 of 1994, as amended) on the DEQ Part 201 Site List, indicates that no impacted sites are located in the project area for construction of the proposed rock ramp. It is unlikely that construction of the proposed rock ramp would encounter any contaminated materials; however, as a precaution, the construction contract would contain standard language on procedures to follow to help ensure that there are no releases and that the materials are properly remediated where applicable, in the event that contaminated materials are encountered.

5.20 No HTRW material is anticipated to be encountered during construction of the proposed project. A former landfill is located on City owned wastewater treatment plant facility property downstream of where the proposed rock ramp would be constructed (refer to Figures 3 and 8). The current proposed use of this area is work and storage, with an access road to be constructed along the river bank. An investigation at the nearby former landfill was conducted to investigate subsurface conditions. In December, 2010, the City of Frankenmuth, DEQ and USACE conducted six test pits throughout the area of the landfill where surface or subsurface work could potentially occur. Test pits revealed dry to moist fill material (clay and sand, some silt) medium brown to dark brown; a large quantity of glass (intact and broken bottles) and bottle caps; concrete and wood; some asphalt, bricks, metal; and occasional plastic. Test pits had either no or a slight biological / organic odor. No groundwater or leachate was encountered. The DEQ collected and performed chemical analysis on eight soil samples for: volatile organic compounds, polynuclear aromatics, metals (arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, silver and zinc), polychlorinated biphenyls and pesticides. The chemical analysis indicated minimal to non-detection limits. Therefore, the material, if excavated, is acceptable to be disposed of at a Type II / municipal solid waste landfill. It is anticipated that no excavation of landfill material will occur; however, if some excavation becomes necessary, the material would be disposed of at a licensed landfill, or potentially on part of the City owned wastewater treatment plant facility property (an area of the site adjacent to the proposed access road, currently a mixture of vacant and overgrown grass / shrubs), out of the floodway and per DEQ requirements and approval (i.e., submitted and approved workplan). Following any excavation into the former landfill, the exposed landfill slopes would be covered with approximately 6" of clay, 2" of topsoil and re-vegetated. Erosion control would be maintained until vegetation is well established.

5.21 Recreation. The proposed action would not negatively impact recreational activities at the project site. A dam has existed at the project site for approximately 160 years. Since the proposed action does not involve removal of the dam, water levels in the area would remain similar and recreational activities would not be significantly impacted. Some recreation (mainly fishing and leisure enjoyment of the general area) activities would encounter minor, short-term disturbances during the proposed construction.

5.22 Noise, Aesthetic Quality and Traffic. Although noise disturbances may occur during the proposed construction, they would not be significant or long-term. Noise and other associated impacts from the presence of heavy machinery and trucking of construction materials, including air emissions and vibrations, would not be expected to exceed levels necessary for the protection of public health and welfare. The presence and operation of such equipment could interfere with the aesthetic setting of the area. Annoyance resulting from noise and typical construction site conditions involves the subjective responses of individuals. Aesthetic elements in the area could be temporarily affected during construction, but disturbances would be short-term. The rock ramp would incorporate natural features with the use of rock and fit in with the general natural feel of the area (refer to cover page image and Figure 7). Numerous parks located in the general vicinity of Frankenmuth, some along the Cass River, would provide temporary alternatives during the proposed work.

5.23 Based on a 10-hour work day and 6-day work week, it is anticipated that there would be an average of 20 trucks entering / leaving the site per day over a 2-3 month construction period. This period would involve construction of an access road and construction of the proposed rock ramp. All equipment and / or materials hauled to and from the project site would use approved hauling routes and abide by local, state, and federal hauling requirements. Access to the site would be via the proposed access road along the south side of the river, minimizing disruption to streets in downtown Frankenmuth. The contractor would be required to coordinate with the local authorities regarding use of access routes, safety and traffic signage project site. The temporary increase in traffic and construction activities would be short-term and minor, and not have significant adverse effects. The proposed action would be in the water and conducted with minimal interference to navigation, as a dam is already present at the site. The contractor would be required to coordinate with the local authorities regarding use of access routes and obtain the appropriate permit(s), if necessary.

5.24 Maintenance. O&M activities would occur periodically following completion of the project. The impacts of maintenance would be similar to those expected for the proposed action, but of smaller magnitude. In general, maintenance activities (e.g. temporary mobilization of land-based heavy equipment to adjust locations of rocks) would have short-term adverse effects on the environment. Significant cumulative adverse effects of O&M would not be expected. Future modifications to the riffles can be done cost effectively after construction by altering the placement of boulders, rock, and stone to create optimal sized and spaced weirs and pools to allow for successful fish passage. Debris removal on rock ramp would be periodic and not significant to the environment.

5.25 Cumulative Impacts. The proposed action would not result in significant adverse cumulative impacts. The project would restore fish passage to spawning and juvenile rearing habitat located upstream of the Frankenmuth Dam. This habitat was historically available to aquatic species in the Saginaw Bay watershed. In addition, the rock ramp may provide new spawning habitat for fish species such as lake sturgeon. Although additional lamprey may pass as a result of the proposed action, their numbers would not likely increase significantly due to lack of preferred lamprey habitat upstream of the dam and FWS control methods (i.e., use of lampricides or traps). The proposed action would benefit the overall biodiversity of the Cass River and Saginaw Bay watersheds, and in particular walleye recovery, contributing to the restoration of the native fishery in the Great Lakes.

6.0 STATE AND FEDERAL AGENCY COORDINATION

6.1 The proposed action was coordinated with the Michigan State Historic Preservation Officer (SHPO), State of Michigan (Michigan Department of Environmental Quality [DEQ] and Michigan Department of Natural Resources [DNR]), U.S. Fish and Wildlife Service (FWS), nearby Native American Tribes, and the U.S. Environmental Protection Agency (EPA). Coordination is included in Attachment C of the EA.

6.2 Michigan State Historic Preservation Office. In compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, the Michigan State Historic Preservation Officer (SHPO) was consulted with regarding the proposed project. The SHPO

provided two opinions via letter (March 20, 2009 for the proposed rock ramp, and March 23, 2012 for potential excavation in the vicinity of the former landfill) that *no historic properties are affected* within the area of potential effects of the proposed undertaking.

6.3 State of Michigan. Based on correspondence with the DEQ, a Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction. In a response letter dated July 9, 2009, the DEQ and DNR Fisheries Division expressed support of actions to retrofit dams into rock ramps which would restore connectivity of the river system and help rebuild Great Lakes fisheries. Their letter requested that the EA address measures for soil erosion and sediment control including construction sequencing and other best management practices, as well as the advantages and disadvantages of the project as related to the aquatic environment. In response, these items have been addressed in this EA. Per recommendation from the State of Michigan, in-stream work would be avoided during the period of March 15 to May 31 to minimize negative effects on several spawning fish species in the area. It is anticipated that most construction would occur during the summer low flow period. Ongoing communication regarding fish passage and hydrologic modeling has occurred with the DEQ and DNR throughout 2012, including coordinated review of hydrologic studies and models. Appropriate coordination will continue with the State of Michigan as the project is finalized and constructed.

6.4 U.S. Fish and Wildlife Service. In accordance with the NEPA, Endangered Species Act of 1973, as amended, and the Fish and Wildlife Coordination Act, the USACE coordinated this project with the FWS. In January 2010, the FWS concurred with the USACE's determination that the proposed construction of a rock ramp would not have an effect on federally listed species and / or critical habitat, though they did express some concern about possible sediment transport. Potential sediment sources for the proposed project include excavation activities or disruption to sediments trapped behind the Frankenmuth Dam. The proposed construction activities related to placement of the rock ramp are not anticipated to cause significant disturbances to in-stream sediments since the riverbed at the project site is mainly stone and gravel with few fines and below grade excavation in-stream would be minimal. Fines have not been identified to be trapped behind the existing dam, and the dam would remain in place in order to maintain desired upstream water levels. Appropriate erosion control and project sequencing would be implemented to minimize release of bank sediments into the river during construction activities. Additional communication and informal consultation with the FWS was conducted in fall 2011 to discuss potential excavation and vegetation clearing along the river and at the former landfill. Based on the type of habitat present, location of the site, proposed tree cutting period and conversations with the FWS (refer to paragraph 5.12 above for additional details), the Detroit District, has made the determination that the project action involving tree removal at the landfill *may affect but is not likely to adversely affect* the federally listed species, Indiana bat. The USACE received a letter from the FWS (dated January 13, 2012) in which they concur that the proposed action is not likely to adversely affect the Indiana bat.

6.5 Native American Tribes. A letter dated March 25, 2009 was received from the curator at the Ziibiwing Center of Anishinabe Culture & Lifeways, Saginaw Chippewa Indian Tribe of Michigan. The letter indicates that the proposed project site is close to an area where they have information indicating the presence of an Indian traditional cultural property. The letter included

a Site Reference Form to be utilized should there be a discovery of Native American human remains or burial objects during construction. The construction of a rock ramp fish passage would involve placement of boulders, rock and other suitable inert materials into the Cass River. It is not expected that the proposed action would impact any Native American or other cultural resources. Tribes would be coordinated with in the event that any archeological or cultural artifacts are encountered. No other Native American Tribes commented on the proposed action.

6.6 U.S. Environmental Protection Agency. A response has not been received from the EPA regarding the proposed action.

7.0 MAJOR FINDINGS AND CONCLUSIONS

7.1 Environmental review of the proposed action to construct a rock ramp at the Frankenmuth Dam to allow for fish passage indicates that no significant cumulative or no long-term adverse environmental impacts would be expected as a result of the proposed action. The proposed rock ramp would restore access to approximately 73 miles of riverine habitat (consisting of the main branch of the Cass River and tributaries), considerably increasing access to historically significant spawning and juvenile rearing habitat for several desirable fish species, including walleye, suckers, and lake sturgeon. Restored access to upstream spawning and juvenile rearing habitat for walleye would contribute to the overall restoration of the fishery in the Great Lakes and the Great Lakes ecosystem in this region. This project would alter the stream at this location, and would require periodic maintenance, but impacts would not be expected to be significant and the benefits to the fishery far outweigh temporary impacts of construction and alterations to the Cass River at this location. Space for integrated sea lamprey traps would provide a tool to help assess the sea lamprey in the Cass River and upstream tributaries.

7.2 Alternatives considered included: a fish bypass channel; a rock ramp; a spiral fish ladder; dam removal; and no federal action. Construction of a fish bypass channel was not pursued due to space limitations along the riverbanks at the project site, the required long-term operation and maintenance, potential issues in attracting fish to the bypass openings, and cost. A spiral fish ladder was not pursued due to operating costs, needed maintenance to maintain flow conditions, potential mortality rate for small fish species, and potential issues in attracting fish to the fish ladder openings. Dam removal was not acceptable to the City and was not pursued. The no federal action alternative was not pursued because it would result in continued restricted fish access to desirable fishery spawning and juvenile rearing areas.

7.3 The proposed action has been reviewed pursuant to the following Acts and Executive Orders, as amended: National Environmental Policy Act of 1969; Fish and Wildlife Act of 1956; Fish and Wildlife Coordination Act of 1958; National Historic Preservation Act of 1966; Clean Air Act of 1970; Executive Order 11593, Protection and Enhancement of the Cultural Environment, May 1971; Coastal Zone Management Act of 1972; Endangered Species Act of 1973; Water Resources Development Act of 1976; Clean Water Act of 1977; Executive Order 11990, Wetland Protection, May 1977; Executive Order 11988, Floodplain Management; and the Farmland Protection Policy Act (Subtitle I of Title XV of the Agriculture and Food Act of 1981). The proposed rock ramp has been found to be in compliance with the above Acts and Executive

Orders.

7.4 The general objective of Executive Order (EO) 11988, Floodplain Management, is to avoid, to the maximum extent possible, long and short-term adverse impacts associated with the occupation and modification of the base floodplain whenever there is a practical alternative to such an action. A hydraulic study of the proposed design criteria supports a rock ramp structure as a suitable option for providing fish passage on the Cass River at Frankenmuth. The study determined that that criteria for spring spawning and migration flow would be met and that overbank excavation at the former landfill site would not be necessary as water surface elevations would not increase during a 1% chance (100-year) flood event when compared to current conditions. The proposed rock ramp does not create a harmful interference to life, or property at this site. This proposition complies with the Federal Executive Order 11988, Floodplain Management, because there is no practicable alternative to construction in the floodplain. The USACE would pursue necessary activities to fulfill the State of Michigan's requirements for a floodway permit.

7.5 Pursuant to the CWA, an evaluation according to the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230) has been prepared because there will be a discharge of fill material in waters of the U.S. associated with the proposed action (Attachment B). The Section 404(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act." A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction. The site is not within the State of Michigan's coastal zone as defined by the Coastal Zone Management Program.

7.6 This EA will be made available to the public for a 30-day review period. Following this period and a review of the comments received, a final determination would be made by the District Engineer regarding the necessity of preparing an Environmental Impact Statement (EIS) for the proposed action.

7.7 Based on the conclusions of this EA, it appears that preparation of an EIS would not be required; therefore, a Preliminary Finding of No Significant Impact (FONSI) is included with this EA (Attachment D). If, after public review, the District Engineer determines that an EIS is not necessary, the Preliminary FONSI would be finalized and the construction implemented as funds become available.

8.0 REFERENCES

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WadeTrim. January 23, 2008. *Conceptual Design Report, Frankenmuth Dam Fish Passage Design, Frankenmuth, Michigan.*

ATTACHMENT A

FIGURES AND PHOTOGRAPHS

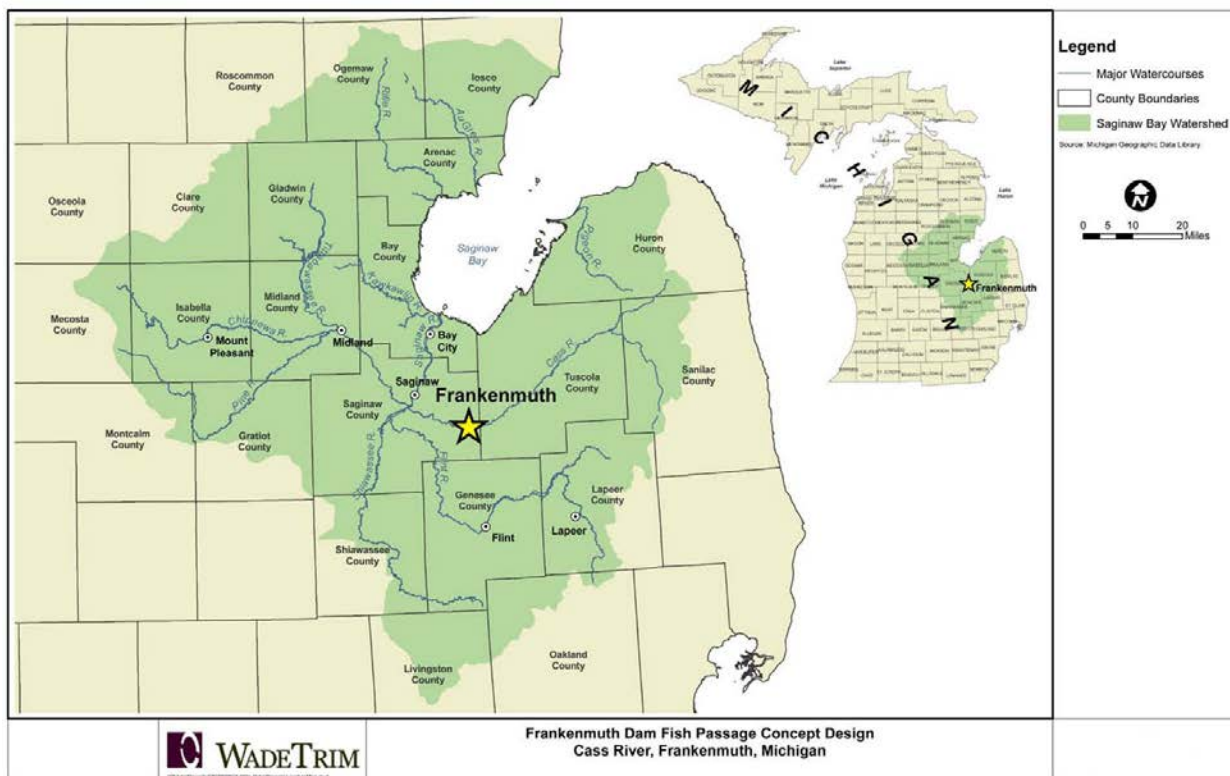


Figure 1: Site Location Map for Frankenmuth, Michigan.

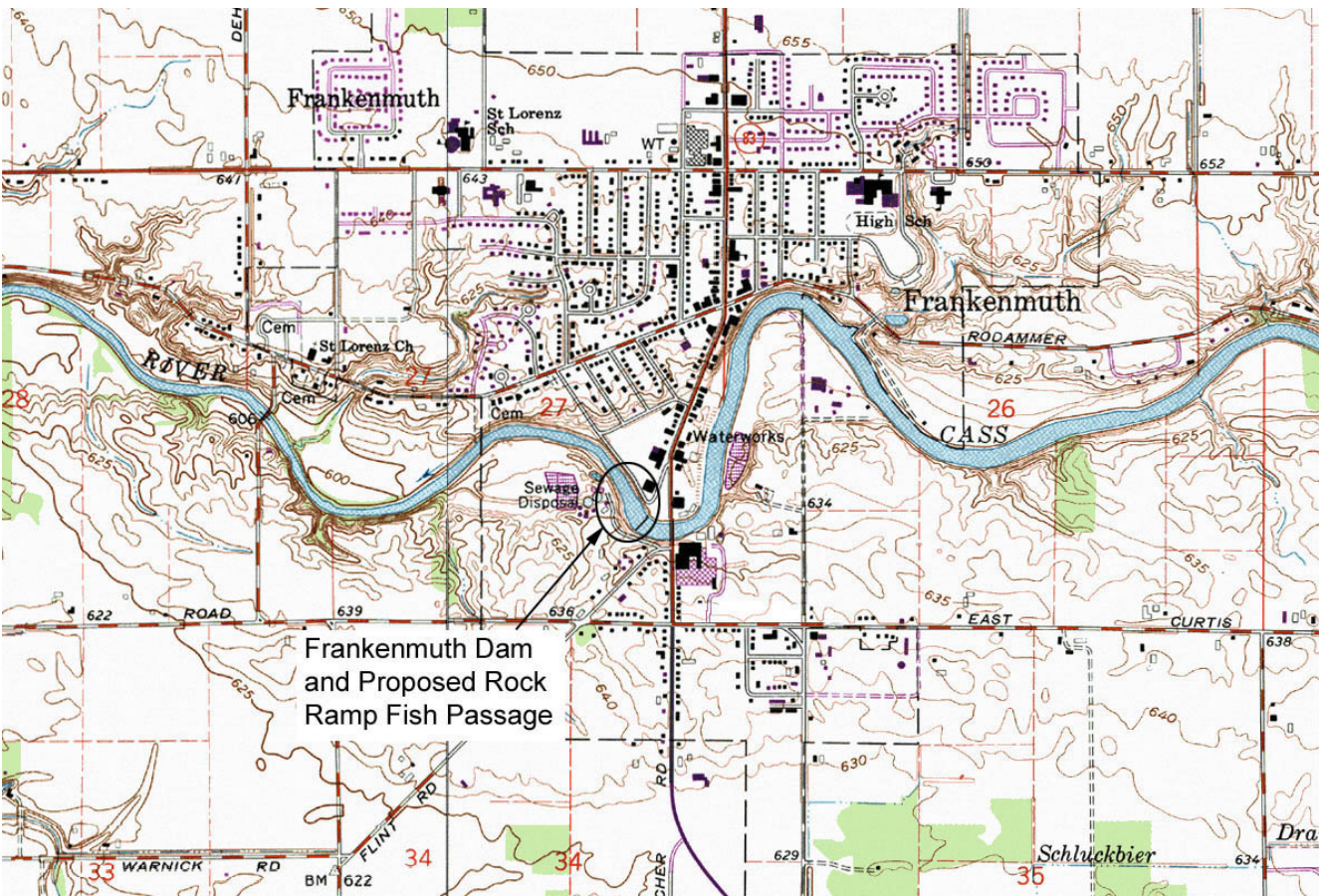
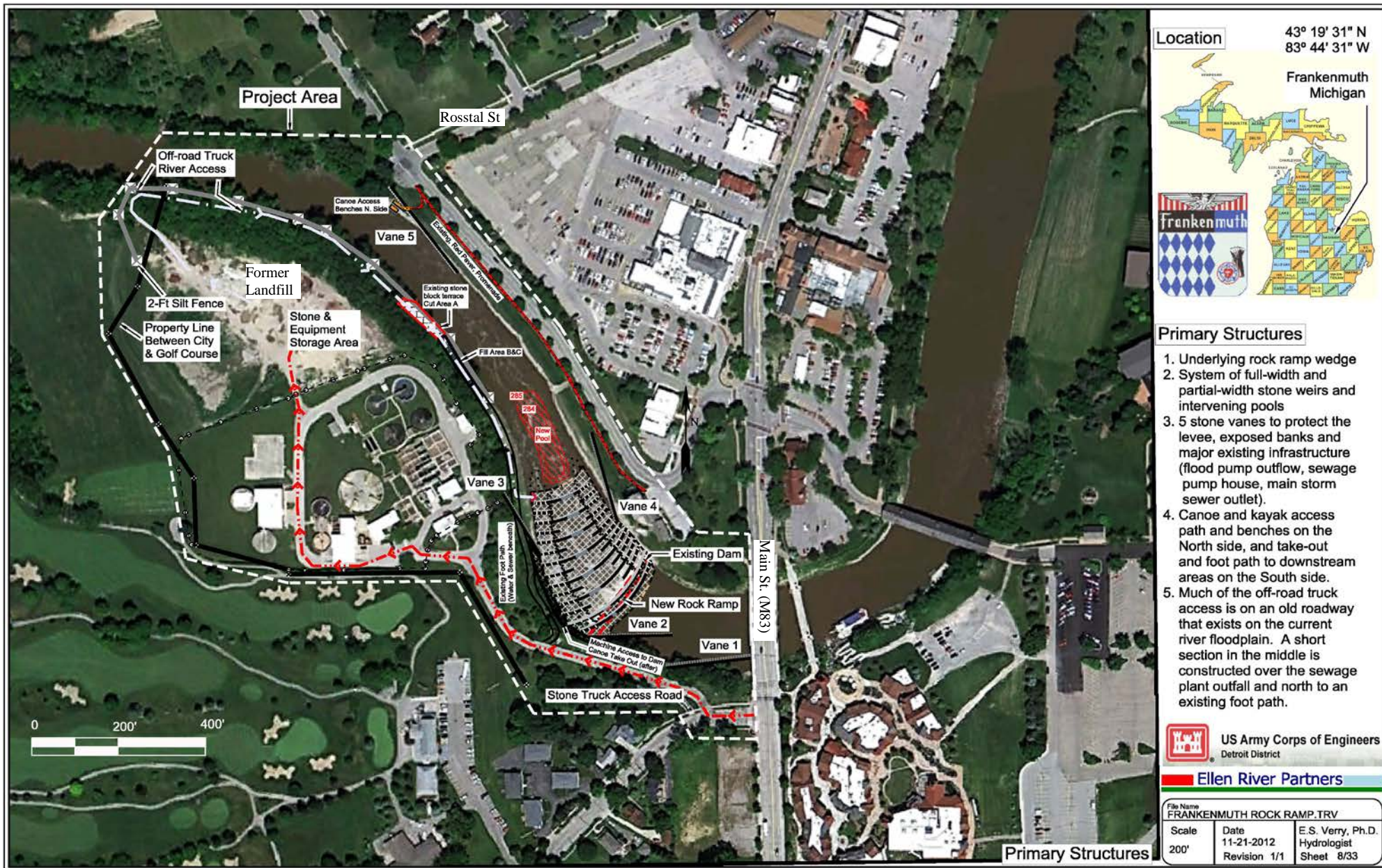


Figure 2: Topographical Map for Frankenmuth, Michigan.



Traverse PC

Figure 3: Aerial photograph of existing dam and proposed rock ramp site plan.

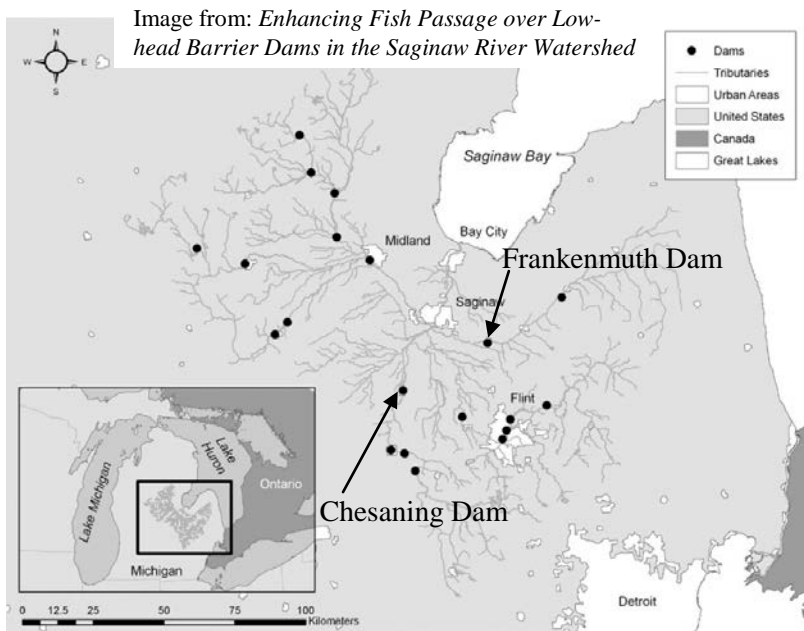


Figure 4: Map of Frankenmuth Dam location in the Saginaw River Watershed.



Figure 5: Overview looking upstream (southeast) at the Frankenmuth Dam (Fall 2008).



Figure 6: Looking northeast at the downstream face of the Frankenmuth Dam (Fall 2008).



Figure 7: Typical rock ramp fish passage. Photo taken during construction, during low-flow period (August 2009). Site located in Chesaning, Michigan.

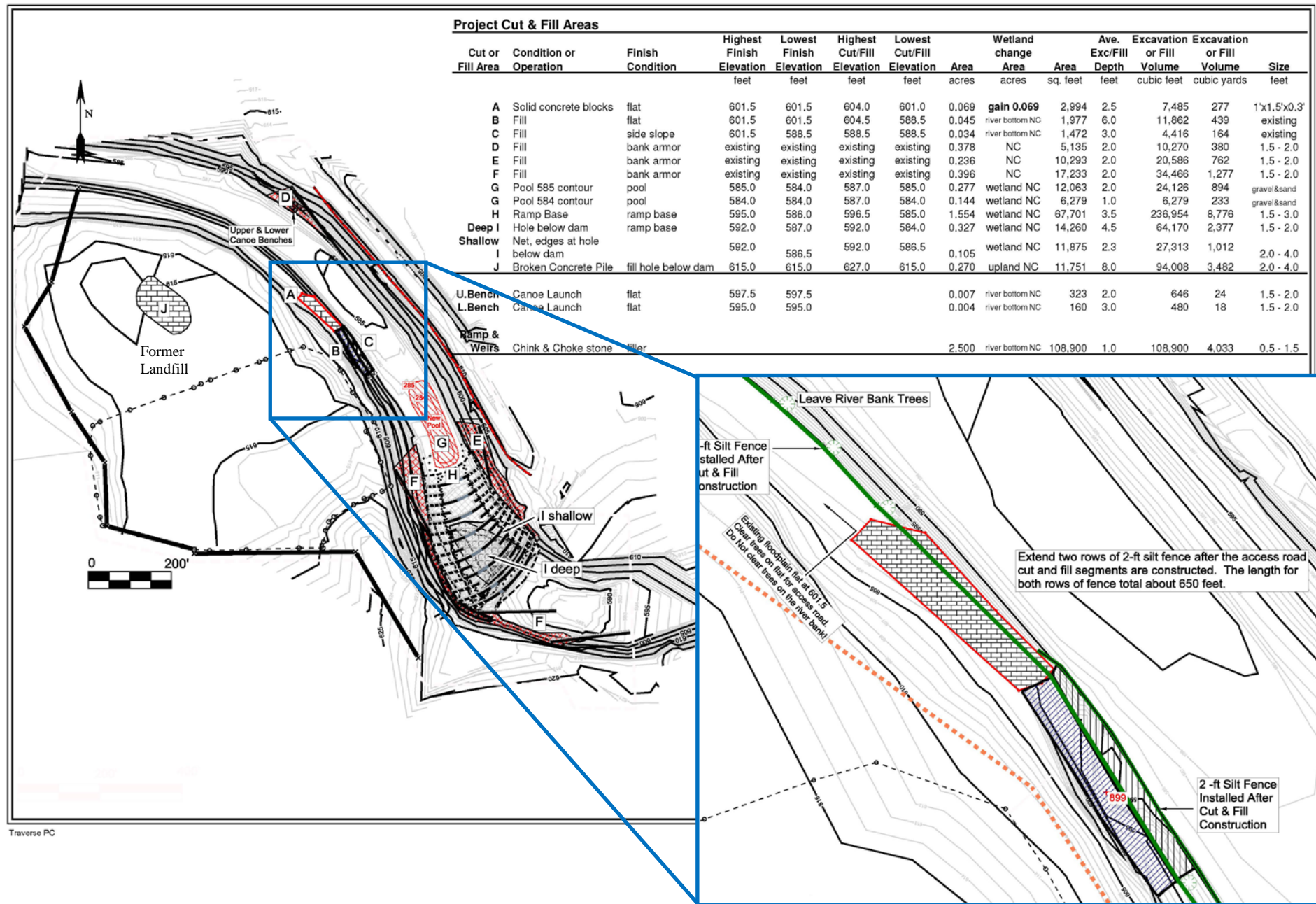
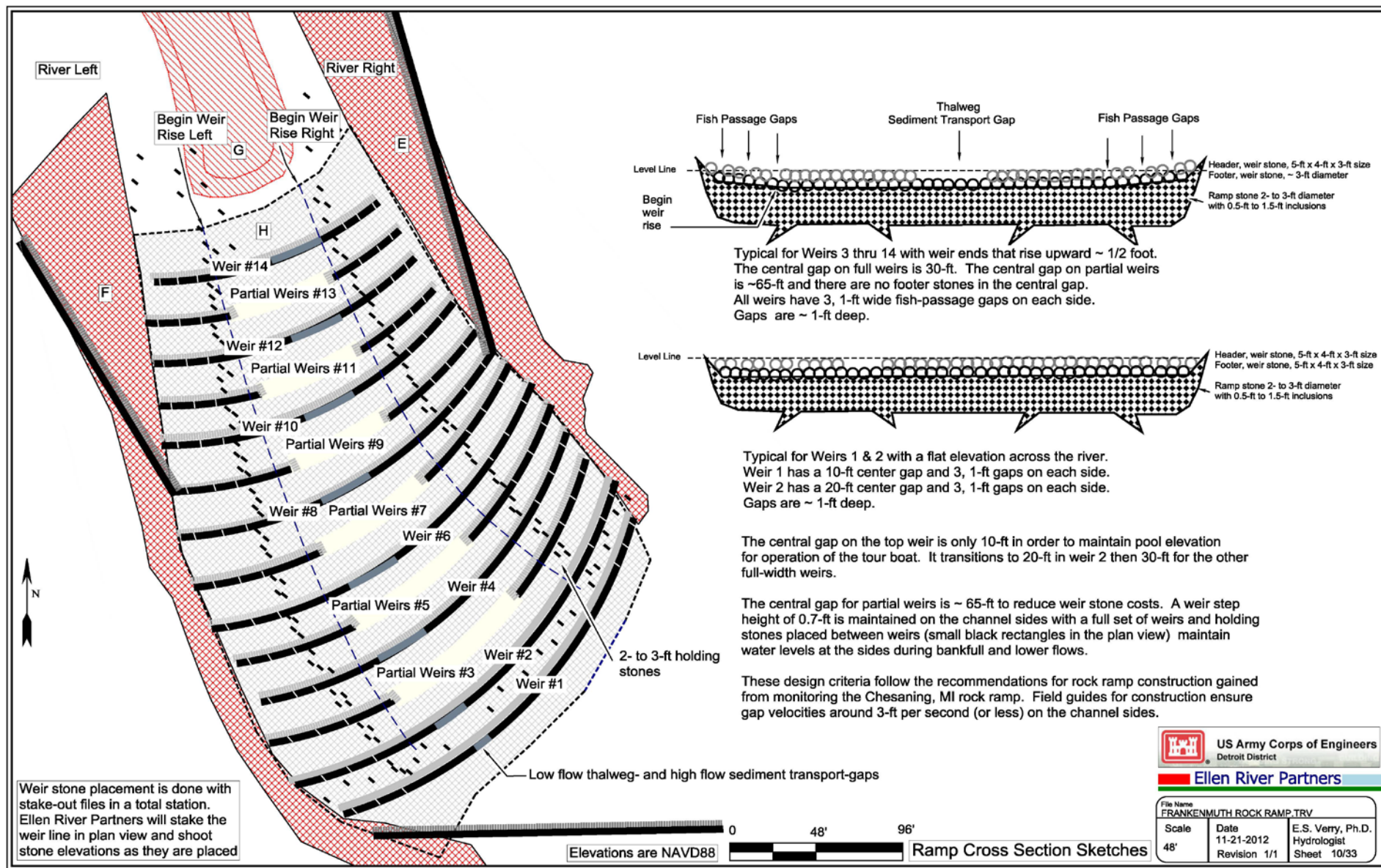
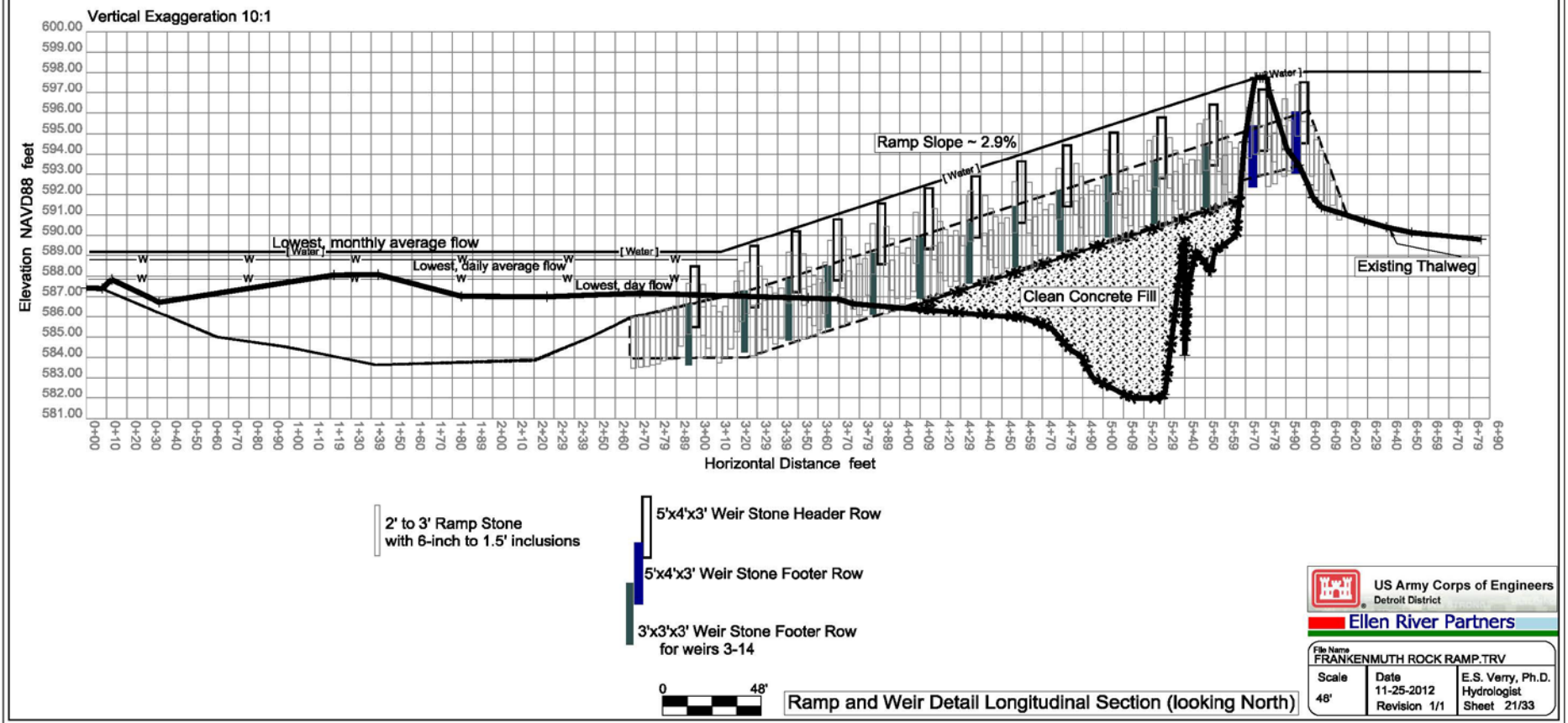


Figure 8: Proposed cut and fill areas



Traverse PC

Figure 9: Proposed rock ramp plan and typical cross sections.



Traverse PC

Figure 10: Existing and proposed rock ramp profile.

ATTACHMENT B

SECTION 404(b)(1) EVALUATION PURSUANT TO THE CLEAN WATER ACT

**FRANKENMUTH DAM FISH PASSAGE
CASS RIVER
SAGINAW COUNTY, MICHIGAN**

**CLEAN WATER ACT
SECTION 404(b)(1) EVALUATION
Of the Effects of Placing Fill Material into the Waters of the United States**

I. PROJECT DESCRIPTION

a. Project Location. The U.S. Army Corps of Engineers, Detroit District (USACE) proposes construction of a rock ramp fish passage at the Frankenmuth Dam. The Frankenmuth Dam is located on the Cass River in the City of Frankenmuth (City), Saginaw County, Michigan and is part of the Saginaw Bay Watershed (Environmental Assessment [EA] Attachment A, Figures 1, 2, 3 and 4).

b. General Description of Project. The Frankenmuth Dam prevents several desirable fish species, particularly walleye but also including suckers and lake sturgeon, from accessing historically available spawning and juvenile rearing habitat located upstream in the Cass River and in Cass River tributaries. The Cass River, Frankenmuth Dam was one of six key sites the *Michigan Department of Natural Resources Saginaw Bay Walleye Recovery Plan* (Fielder and Baker, 2004) identified for fish passage to achieve successful restoration of the walleye fishery in Saginaw Bay and Lake Huron. The proposed action would restore access for walleye, sucker, bass and other species to approximately 73 miles of river and tributary spawning and juvenile rearing habitat, up to the Caro Dam. Fish species such as lake sturgeon could also utilize the structure itself as spawning habitat. The rock ramp would benefit the overall ecological diversity and fisheries of the Cass River and the Saginaw Bay watersheds.

The proposed rock ramp would be constructed starting downstream of the Frankenmuth Dam, by creating rock weirs and resting pools along a gradual slope (approximately 2.9%) up to and encompassing the existing dam's footprint. The rock ramp would provide a smooth transition from the natural stream to the existing dam, allowing fish to pass the dam. Refer to EA Attachment A, Figures 9 and 10 for proposed rock ramp plan, typical cross sections and profile. The existing dam will not be removed since existing upstream water levels are desired by the City, but the top approximate 4 feet of the dam will be removed and replaced with the rock ramp structure. Any necessary modifications to the dam (e.g., grouting, partial dam demolition, toe stone replenishment or reinforcement) would be coordinated with appropriate phases of the rock ramp construction.

The rock ramp design includes space for two (2) portable sea lamprey traps within the river channel near the dam. A permanent access road would be constructed along the riverbank, and extend from near the dam to approximately 1,300 feet downstream.

c. Authority. This project is being conducted under the authority of Section 506 (Great Lakes Fishery and Ecosystem Restoration) of the Water Resources Development Act (WRDA) of 2000

(42 U.S.C. 1962d-22[c], PL 106-541), as amended, which provides for the planning, design, construction, and evaluation of projects to restore the fishery, ecosystem, and beneficial uses of the Great Lakes in cooperation with other Federal, State, and local agencies including the U.S. FWS, the DNR, and the Partnership for the Saginaw Bay Watershed.

d. General Description of the Dredged / Fill Material. The material that would be used to construct the proposed rock ramp would include a mixture of clean gravel, sand and various sized stone, rock, boulders and other suitable inert materials from a USACE approved source. Shore bank stabilization would include a combination of rip-rap, straight vanes, vegetation and other bioengineering methods. The vanes are structures, in the case of this project stone, used to prevent shoreline erosion and redirect river flow energy back toward the center of the river.

e. General Description of the Proposed Discharge Site(s).

- (1) Location. The proposed rock ramp site is located at the existing Frankenmuth Dam in the Cass River. The site would extend approximately 350 feet downstream of the dam, and may extend approximately 50 feet upstream of the base of the dam. The proposed access road is located along the south side of the Cass River.
- (2) Size. The proposed rock ramp would begin just upstream of the dam, encompass the dam and extend approximately 350 feet downstream of the dam, and occupy the entire width of the river. The height of the rock ramp would roughly match the existing dam. The total in-water project site would be approximately 1.3 acres. A staging area / access road would be constructed along the riverbank.
- (3) Type of site(s). The proposed rock ramp would occupy the shallow-waters of the Cass River in the immediate vicinity of the existing Frankenmuth Dam and extending downstream of the dam. The majority of access road construction would occur above the waterline with exception of a small cut and fill area (Figure 8 of EA).
- (4) Type(s) of habitat. The riverbed is comprised of mainly gravel, cobble and sand, with some fines. The banks of the Cass River in the area of the dam and project site are relatively steep and mostly grass with some stone reinforcement as part of USACE flood management and protection projects and local soil erosion control projects.
- (5) Timing and duration of discharge. Construction would likely occur in the late summer or early fall when stream flows are lower, as to minimize impacts and risks from high spring and fall water flows. Per recommendations from the State of Michigan, in-stream work would be avoided for the period of March 15 to May 31 to minimize negative effect on several spawning fish species in the area. Construction activities would occur over a 2-3 month period.

f. General Description of Disposal Method. It is anticipated that construction of the proposed rock ramp would occur using heavy, land-based equipment from the riverbanks. Placement of material would generally begin with smaller sized gravel and conclude with placement of larger boulders.

II. FACTUAL DETERMINATION

a. Physical Substrate Determinations. Fill material placed would be similar to substrate material. Gravel, sand and various sized stone, rock and boulders would be placed on existing predominantly sand and gravel riverbed.

- (1) Substrate elevation and slope. The elevation of the existing river bottom would be increased. The rock ramp would consist of rock weirs and resting pools along a gradual slope (approximately 2.9%) up to and encompassing the existing dam's footprint. The upstream end of the rock ramp would roughly match the height of the existing dam to allow fish to pass over the dam.
- (2) Sediment type. No significant change in sediment type is expected.
- (3) Dredged / fill material movement. Since fines are not being placed in the river as part of construction, it is not anticipated that there will be any significant movement of the fill material.
- (4) Other effects. Not applicable.

b. Water Circulation, Fluctuation, and Salinity Determinations.

- (1) Water.
 - (a) Water chemistry – No significant effect.
 - (b) pH – No significant effect.
 - (c) Salinity – No significant effect.
 - (d) Salinity Gradients – Not applicable.
 - (e) Clarity – Minor, temporary increases in turbidity may occur during construction of the proposed rock ramp. This could cause short-term reduction in water clarity. Effects on clarity would be minimal as very little fines are anticipated to be disturbed.
 - (f) Color – A minor, temporary change in color may occur due to the potential minor increase in turbidity during construction. These effects would return to pre-project conditions shortly after completion of construction.
 - (g) Odor – No significant effect.
 - (h) Taste – No significant effect.
 - (i) Dissolved gas levels – No significant effect. Construction of the rock ramp would likely increase water turbulence and thus increase dissolved oxygen (DO) concentrations in the river. Low DO concentrations are not known to be an issue in this area of the Cass River; however, increased DO would be an added benefit to the river during low water, high temperature summer months. No other significant changes in dissolved gas levels are anticipated.
 - (j) Temperature – No significant effect.
 - (k) Nutrients – No significant effect.
 - (l) Eutrophication – No significant effect.

- (2) Current Patterns and Circulation. Current conditions include presence of a dam.
- (a) Current patterns and flows – There would be no changes to the pattern, flow or location of the existing riverbed; therefore there would be no significant effect.
 - (b) Velocity – Water velocity immediately downstream of the dam, along the proposed rock ramp structure, would slow slightly due to the added friction of the stone placed in the river for the ramp; however, there would be no significant effect.
 - (c) Stratification – No significant effect.
 - (d) Hydrologic effect – No significant effect.

(3) Normal Water Level Fluctuations. No significant effects to normal water level fluctuations are anticipated.

(4) Actions That Will Be Taken to Minimize Impacts. The contractor would prepare and / or obtain any required erosion and sediment control plans and permits. Soil erosion control methods would be put in place prior to beginning construction activities to minimize bank sediments from entering the river system. Any disturbed areas or temporary construction sites would be re-vegetated to similar conditions for long-term erosion control, or restored as applicable, upon project completion.

c. Suspended Particulate / Turbidity Determinations.

- (1) Change at Placement Site. A minor, temporary increase in turbidity may occur during construction of the proposed rock ramp. This could cause short-term reduction in water clarity. Effects on clarity would be minimal as the river bottom in this area is predominantly gravel, cobble and sand with few fines, and fill material would not consist of fines. These effects would return to pre-project conditions when materials are not being placed in-water and shortly after completion of construction.
- (2) Effects on Physical Properties of the Water Column. Ambient conditions of the Cass River at the project site are generally turbid.
- (a) Light penetration – No significant effect.
 - (b) Dissolved oxygen – No significant effect during construction. After construction, presence of the rock ramp would likely cause a slight increase in water turbulence and thus could increase dissolved oxygen concentrations in the river downstream of the dam. Though a potential benefit, a slight increase in DO concentrations is not considered significant because low DO concentrations are not an issue in the vicinity of the proposed project.
 - (c) Aesthetics – No significant effect.
 - (d) Other as appropriate – None appropriate.
- (3) Effects on Biota (primary production, photosynthesis, suspension / filter feeders, sight feeders). No significant effect. Temporary turbidity would be minimal and localized at the project site, and would decrease quickly with increased distance from the work area.
- (4) Actions to Minimize Impacts. The project would be in compliance with the State of Michigan water quality certification.

d. Contaminant Determinations. Only clean fill, gravel, sand, rock, boulders or other suitable inert material (i.e., clean, broken concrete) brought in from USACE approved sources or approved by the USACE would be placed in-water to construct the slope, weirs and rock ramp features. Source materials would be free of metal, chemical and biological contamination. No contamination is known to exist at the disposal / placement site.

- (1) Metals. No significant effect.
- (2) Chemical characteristics. No significant effect.
- (3) Biological content / pathogens. No significant effect.

e. Aquatic Ecosystem and Organism Determinations. No significant effects.

(1) Federally listed species. No significant effects on Federally listed species or their critical habitat. The proposed action was reviewed in accordance with the National Environmental Policy Act (NEPA), Endangered Species Act (ESA) of 1973, as amended, and the Fish and Wildlife Coordination Act. Habitat for listed endangered, threatened or candidate species is not present in the area where project construction of the rock ramp is to take place.

(2) Fish, crustaceans, mollusks, and other aquatic organisms in the food web. No significant negative impacts to desirable Cass River fish populations are anticipated as a result of this project. Access to upstream habitat would contribute to a long-term restoration of the native fishery in the Great Lakes. In addition, fish such as the lake sturgeon may spawn directly in the rock ramp structure. Bottom dwelling organisms and fish habitat would be expected in and among the gravel and riverbed material that make up the existing river bottom in the immediate area of the proposed action. Although these habitats would likely be disturbed, destroyed and / or altered during construction activities, no significant fish or wildlife habitat is known to occur at the site of these temporary effects. Benthic organisms such as arthropods, phytoplankton and various insects would re-colonize the site upon completion of the project. The rock ramp would provide similar benthic habitat. Varied water velocity and increased cavities provided by the rock ramp would provide additional habitat for existing microorganisms. This would result in an increase in invertebrate and fish biodiversity and benefit the ecosystem.

(3) Mammals, birds, reptiles, amphibians and other wildlife. Construction of the proposed rock ramp would have no significant effects on terrestrial or other wildlife.

(4) Effects on special aquatic sites.

- (a) Sanctuaries and refuges – Not present.
- (b) Wetlands – Not present.
- (c) Mud flats – Not present.
- (d) Vegetated shallows – Not present.
- (e) Coral reefs – Not present.
- (f) Riffle and pool complexes – No significant adverse effect.

(5) Other. Municipal and private water supplies would not be effected by the proposed action. Minimal impacts on recreational fishing could occur during construction, but there would be no significant long-term negative effects on recreational fisheries. Commercial

fisheries are not present. There would be no significant effect on water-related recreation. Aesthetics could be temporarily impacted during construction activities; however once constructed the proposed rock ramp would not have negative effects on the area's aesthetics. No parks, national and historical monuments, national seashores, wilderness areas, research sites or similar preserves would be effected.

f. Proposed Disposal Site Determinations.

(1) Mixing zone determinations. The mixing zone is not expected to extend far beyond the footprint of the proposed rock ramp due to the type of material present in the river and type of material being placed.

- (a) Depth of water at disposal site – Shallow; approximately 3 feet just downstream of dam to less than 1 foot near downstream extent of proposed project site.
- (b) Current velocity, direction and variability at disposal site – Average discharge at time of proposed construction (July-September) would be approximately 200 cubic feet per second (cfs).
- (c) Degree of turbulence – Moderate.
- (d) Stratification at disposal site – None.
- (e) Discharge vessel speed and direction – Not applicable.
- (f) Rate of discharge – Not applicable.
- (g) Ambient concentration of constituents (COC) of interest – None.
- (h) Dredged material characteristics, particularly COC, amount of material, type of material (sand, silt, clay, etc.) and settling velocities – None.
- (i) Number of discharge actions per unit time – One time anticipated discharge, during construction of the proposed rock ramp. Placement of rock material would occur periodically throughout construction. O&M activities may include some rearrangement of rock material to improve functioning of the structure.
- (j) Other factors of disposal site that affect the rates and patterns of mixing – None.

(2) Determination of compliance with applicable water quality standards. The project would be in compliance with applicable State water quality standards.

g. Determination of Cumulative Effects on the Aquatic Ecosystem. The proposed action would restore access to historically significant spawning and juvenile rearing habitat for walleye and would not result in significant negative cumulative effects. Additional information on effects can be found in Section 5 of the EA.

h. Determination of Secondary Effects on the Aquatic Ecosystem. The proposed action would restore access to historically significant spawning and juvenile rearing habitat for walleye and would not result in significant negative secondary effects on the aquatic ecosystem. Additional information on effects can be found in Section 5 of the EA.

III. FINDING OF COMPLIANCE OR NON-COMPLIANCE

- a. Based on the above, the proposed action is determined to be in compliance with Section 404(b)(1) Guidelines of the 1977 Clean Water Act.
- b. Alternatives considered for the Frankenmuth Dam fish passage include: fish bypass channel, rock ramp, spiral fish ladder, dam removal, and no federal action. The no federal action alternative would have resulted in less water quality impact than the proposed action. Excavation of a secondary river channel bypassing the Frankenmuth Dam, along the Cass River, would have been required for a bypass channel, and potentially some for a spiral fish ladder, likely resulting in greater water quality impacts than the rock ramp fish passage (proposed action).
- c. Implementing the proposed action would not violate applicable State of Michigan water quality standards. A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction.
- d. Implementing the proposed action would not result in significant adverse effects on human health or welfare, municipal and private water supplies, recreational fishing, aquatic life, wildlife dependent on the aquatic ecosystem, or the diversity, productivity and stability of the aquatic ecosystem at the project site. The proposed action has been coordinated under Section 7 of the Endangered Species act. Federally listed endangered or threatened species or their critical habitats would not be significantly effected.
- e. Appropriate steps would be taken to minimize adverse environmental impacts on the aquatic ecosystem. Contract specifications would include specific environmental protection clauses to ensure protection of natural resources, proper installation of appropriate and effective erosion control measures, and planned sequencing of the construction activities to minimize effects on spawning.
- f. The completed action would aid in the recovery of target fish species (walleye) and contribute to overall diversity and restoration of the Great Lakes fishery. On the basis of the *Guidelines for Specification of Disposal Sites for Dredged or Fill Material* (40 CFR part 230), it has been determined that the proposed action is in compliance with Section 404 of the Clean Water Act.
- g. No significant adaptations of the Section 404(b)(1) Guidelines were made relative to this evaluation.

ATTACHMENT C

AGENCY COORDINATION



JENNIFER GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF HISTORY, ARTS AND LIBRARIES
LANSING

DR. WILLIAM ANDERSON
DIRECTOR

March 20, 2009

KAREN KREPPS
DETROIT DISTRICT CORPS OF ENGINEERS
PO BOX 1027
DETROIT MI 48231-1027

RE: ER-09-183 Frankenmuth Dam Fish Passage Project on Cass River, Section 27, T11N, R6E, City of
Frankenmuth, Saginaw County (US ACE)

Dear Ms. Krepps:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that no historic properties are affected within the area of potential effects of this undertaking.

The views of the public are essential to informed decision making in the Section 106 process. Federal Agency Officials or their delegated authorities must plan to involve the public in a manner that reflects the nature and complexity of the undertaking, its effects on historic properties and other provisions per 36 CFR § 800.2(d). We remind you that Federal Agency Officials or their delegated authorities are required to consult with the appropriate Indian tribe and/or Tribal Historic Preservation Officer (THPO) when the undertaking may occur on or affect any historic properties on tribal lands. In all cases, whether the project occurs on tribal lands or not, Federal Agency Officials or their delegated authorities are also required to make a reasonable and good faith effort to identify any Indian tribes or Native Hawaiian organizations that might attach religious and cultural significance to historic properties in the area of potential effects and invite them to be consulting parties per 36 CFR § 800.2(c-f).

This letter evidences the US ACE's compliance with 36 CFR § 800.4 "Identification of historic properties", and the fulfillment of the US ACE's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected".

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking. If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.

If you have any questions, please contact Brian Grennell, Environmental Review Specialist, at (517) 335-2721 or by email at ER@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,

Martha MacFarlane Faes
Environmental Review Coordinator

for Brian D. Conway
State Historic Preservation Officer

MMF: JRH: kam

STATE HISTORIC PRESERVATION OFFICE, MICHIGAN HISTORICAL CENTER
702 WEST KALAMAZOO STREET • P.O. BOX 30740 • LANSING, MICHIGAN 48909-8240
(517) 373-1630
www.michigan.gov/hal



RICK SNYDER
GOVERNOR

STATE OF MICHIGAN
MICHIGAN STATE HOUSING DEVELOPMENT AUTHORITY
STATE HISTORIC PRESERVATION OFFICE

GARY HEIDEL
EXECUTIVE DIRECTOR

March 23, 2012

KAREN KREPPS
DETROIT DISTRICT CORPS OF ENGINEERS
PO BOX 1027
DETROIT MI 48231-1027

RE: ER09-183 Frankenmuth Dam Fish Passage Project on Cass River Overbank Excavation and Tree Removal, T11N, R6E, S27, City of Frankenmuth, Saginaw County (USACE)

Dear Dr. Krepps:

Under the authority of Section 106 of the National Historic Preservation Act of 1966, as amended, we have reviewed the above-cited undertaking at the location noted above. Based on the information provided for our review, it is the opinion of the State Historic Preservation Officer (SHPO) that **no historic properties are affected** within the area of potential effects of this undertaking.

The views of the public are essential to informed decision making in the Section 106 process. Federal Agency Officials or their delegated authorities must plan to involve the public in a manner that reflects the nature and complexity of the undertaking, its effects on historic properties and other provisions per 36 CFR § 800.2(d). We remind you that Federal Agency Officials or their delegated authorities are required to consult with the appropriate Indian tribe and/or Tribal Historic Preservation Officer (THPO) when the undertaking may occur on or affect any historic properties on tribal lands. **In all cases**, whether the project occurs on tribal lands or not, Federal Agency Officials or their delegated authorities are also required to make a reasonable and good faith effort to identify any Indian tribes or Native Hawaiian organizations that might attach religious and cultural significance to historic properties in the area of potential effects and invite them to be consulting parties per 36 CFR § 800.2(c-f).

This letter evidences the USACE's compliance with 36 CFR § 800.4 "Identification of historic properties", and the fulfillment of the USACE's responsibility to notify the SHPO, as a consulting party in the Section 106 process, under 36 CFR § 800.4(d)(1) "No historic properties affected."

The State Historic Preservation Office is not the office of record for this undertaking. You are therefore asked to maintain a copy of this letter with your environmental review record for this undertaking. If the scope of work changes in any way, or if artifacts or bones are discovered, please notify this office immediately.

If you have any questions, please contact Brian Grennell, Cultural Resource Management Specialist, at (517) 335-2721 or by email at grennellb@michigan.gov. **Please reference our project number in all communication with this office regarding this undertaking.** Thank you for this opportunity to review and comment, and for your cooperation.

Sincerely,



Brian G. Grennell
Cultural Resource Management Specialist

for Brian D. Conway
State Historic Preservation Officer

SAT:BGG:ses



STATE HISTORIC PRESERVATION OFFICE
702 WEST KALAMAZOO STREET • P.O. BOX 30740 • LANSING, MICHIGAN 48909-8240
www.michigan.gov/shpo (517) 373-1630 FAX (517) 335 0348



JENNIFER M. GRANHOLM
GOVERNOR

STATE OF MICHIGAN
DEPARTMENT OF ENVIRONMENTAL QUALITY
LANSING



STEVEN E. CHESTER
DIRECTOR

July 9, 2009

Mr. Les E. Weigum, Chief
Environmental Analysis Branch
U.S. Army Corps of Engineers
P.O. Box 1027
Detroit, Michigan 48231-1027

Dear Mr. Weigum:

This is in response to the United States Army Corps of Engineers (USACE) February 27, 2009, coordination letter for proposed modifications to the Frankenmuth Dam on the Cass River to provide fish passage.

The Department of Natural Resources (DNR) and the Department of Environmental Quality (DEQ) believes the environmental assessment should clearly identify the advantages and disadvantages of the described alternatives as they concern the aquatic environment.

The DNR Fisheries Division has been in regular contact with representatives of the City of Frankenmuth concerning fish passage at Frankenmuth Dam. The DNR has expressed support for a rock ramp fishway (Alternative 2) designed at a slope of 2-4 percent with multiple flow velocities to allow passage of most warm and cool water fish species. In particular, fish passage for walleye and lake sturgeon is most desirable at this location.

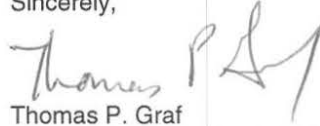
The DNR has reviewed the conceptual illustration in the coordination letter and find it to be an acceptable basic design. We wish to review the selected final detailed design if the rock ramp becomes the chosen course of action.

The DNR Fisheries Division's primary concerns are for minimal impact to the aquatic environment during construction phase. Therefore, we request the environmental assessment (EA) address measures for soil erosion and sediment control including construction sequencing and other best management practices. In addition, the high flows of spring and fall will require the construction phase to occur during low flow period (July, August, and September). Instream work should be avoided for the period of March 15 to May 31 to minimize negative effect on several spawning fish species.

Mr. Les E. Weigum
Page 2
July 9, 2009

The DNR and the DEQ is supportive of actions to retrofit dams, like Frankenmuth Dam, into rock ramps which will restore connectivity of the river system. Fish passage at Frankenmuth Dam has the potential to re-connect an estimated 73 miles of fisheries habitat of the Cass River. If you have any further questions, please contact me.

Sincerely,

A handwritten signature in dark ink, appearing to read "Thomas P. Graf", with a stylized flourish at the end.

Thomas P. Graf
Great Lakes Shorelands Unit
Land and Water Management Division
517-335-3471



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
East Lansing Field Office (ES)
2651 Coolidge Road, Suite 101
East Lansing, Michigan 48823-6316

January 13, 2012

Charles A. Uhlarik, Chief
Environmental Analysis Branch
U.S. Army Corps of Engineers, Detroit District
P.O. Box 1027
Detroit, MI 48231-1027

RE: Endangered Species Act Section 7 Consultation for the Frankenmuth Fish Passage project, Frankenmuth, Saginaw County, Michigan.

Dear Mr. Uhlarik:

Thank you for your request of December 15, 2011 (received December 15, 2011) for informal consultation pursuant to section 7 of the Endangered Species Act (Act) and for comments pursuant to the National Environmental Policy Act and Fish and Wildlife Coordination Act for the proposed Frankenmuth fish passage project. The action area is Frankenmuth, Saginaw County, Michigan.

You propose to construct a rock ramp to allow fish passage beyond the Frankenmuth dam. As part of the proposed action, approximately 2.5 acres of uplands would be excavated above the waterline, requiring the removal of 1.4 acres of trees.

Endangered Species Act Comments

Your analyses addressed potential effects to the endangered Indiana bat (*Myotis sodalis*). You have determined that the proposed action is not likely to adversely affect this species.

In Michigan, summering Indiana bats roost in trees in riparian, bottomland, and upland forests from approximately April through October. Indiana bats may summer in a wide range of habitats, from highly altered landscapes to intact forests. Roost trees vary considerably in size, but those used by Indiana bat maternity colonies are typically greater than 9 inches dbh. Male Indiana bats have been observed roosting in trees as small as 3 inches dbh.

We concur that the proposed action is not likely to adversely affect the Indiana bat for the following reasons:

- All tree clearing will be conducted between January and March 31 of 2012. Indiana bats leave breeding areas for hibernacula in the autumn and return in the early spring and thus

are absent from southern Michigan from November until April. Removing trees in the winter would avoid direct take of Indiana bats.

- Given the small amount of potential habitat proposed to be removed, any effect on Indiana bats will be insignificant.

This precludes the need for further action on this project as required by section 7 of the Act. If the project is modified or new information about the project becomes available that indicates listed species or critical habitat may be affected in a manner or to an extent not previously considered, you should reinitiate consultation with this office.

General Comments

As stated in our letter of April 6, 2009, we have concerns that opening fish passage at the Frankenmuth dam will introduce Great Lakes fishes into inland waters currently inaccessible for these fishes. In general, Great Lakes fishes have higher concentrations of contaminants including organochlorides, dioxin-like compounds, and heavy metals. These toxins have been known to impair or cause reproductive failure, cause deformities and birth defects for organisms higher up in the food chain through the bioaccumulation process.

Specifically, bald eagles may be at greater risk of exposure. Eagles nesting within close proximity of the Great Lakes shorelines may be at higher risk of nest failure and deformities due to their consumption of Great Lakes fishes. Bald eagles currently nest upstream of the Frankenmuth dam and this project may expose those inland eagles to contaminated fish.

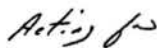
Since our April 2009 letter, our office and the Alpena Fish and Wildlife Conservation Office have been working with you to develop monitoring programs to assess changes in the fish community and to study the transfer of contaminants by fish species into upstream areas of the dam after construction of the rock ramp. We appreciate your partnership and cooperation in responding to our concerns.

Thank you for the opportunity to cooperate with you in conserving endangered species and our natural resources. If you have any questions regarding these comments, please contact Chris Mensing, of this office, at (517) 351-8316 or chris_mensing@fws.gov.

Sincerely,



Scott Hicks
Field Supervisor



cc: Chris Freiburger, MDNR, Fisheries Division, Lansing, MI
Lori Sargent, MDNR, Wildlife Division, Lansing, MI
Andrea Ania, USFWS, Alpena, MI



ZIIBIWING CENTER
of Anishinabe Culture & Lifeways

THE SAGINAW CHIPPEWA INDIAN TRIBE
6650 E. Broadway • Mt. Pleasant, Michigan 48858

March 25, 2009

Mr. Les Weigum
Environmental Analysis Branch
Department of the Army

**Re: Frankenmuth Dam Fish Passage Project
City of Frankenmuth, Saginaw County, MI**

Dear Mr. Weigum;

This letter is in regards to the above referenced project.

The proposed area of concern is close to an area in which we have information indicating the presence of an Indian traditional cultural property.

This office will be available to assist you in the future or during the course of the project if there is discovery of Native American human remains or burial objects. I am sending an Information Letter and a Site Reference Form for your use if such an instance occurs.

Feel free to call my office if you have any questions or requests at 989-775-4730.
We thank you for including this Tribe in your plans.

Sincerely,

William Johnson /elh

Curator
Ziibiwing Center of Anishinabe Culture & Lifeways
Saginaw Chippewa Indian Tribe of Michigan

PHONE (989) 775-4750 or (800) 225-8172, Ext. 1-54750 • FAX (989) 775-4770 • www.sagchip.org/ziibiwing



DEPARTMENT OF THE ARMY
DETROIT DISTRICT, CORPS OF ENGINEERS
477 MICHIGAN AVE.
DETROIT, MICHIGAN 48226-2550

IN REPLY REFER TO:
Planning Office
Environmental Analysis Branch

FINDING OF NO SIGNIFICANT IMPACT

FRANKENMUTH DAM FISH PASSAGE CASS RIVER SAGINAW COUNTY, MICHIGAN

In accordance with the National Environmental Policy Act (NEPA) of 1969, the U.S. Army Corps of Engineers, Detroit District (USACE) has assessed the environmental impacts of the proposed action for fish passage at the Frankenmuth Dam, located on the Cass River in Frankenmuth, Michigan. This project is authorized under Section 506, Great Lakes Fishery and Ecosystem Restoration, of the Water Resources Development Act of 2000 (42 U.S.C. 1962d-22[c], PL 106-541), as amended. Alternatives considered include: a fish bypass channel, a rock ramp, a spiral fish ladder, dam removal, and no federal action. The preferred alternative is construction of a rock ramp by placement of clean fill, boulders, fieldstone and rock starting approximately 350 feet downstream of the existing dam, creating rock weirs and resting pools along a gradual slope (approximately 2.9%) up to and encompassing the existing dam's footprint. The rock ramp would provide passage for walleye (a fish species targeted for recovery in the Great Lakes fishery) and various other aquatic species, and help improve aquatic biodiversity in the ecosystem.

An Environmental Assessment (EA) for the proposed action has been completed and made available to the public for a 30 day review period beginning February 3, 2012. USACE attended a public information meeting in the City of Frankenmuth on February 28, 2012 to discuss the proposed action and answer questions. Comments regarding the proposed action were received and responded to; none of which were significant in nature.

A hydraulic study including computer modeling of the proposed design criteria supports a rock ramp structure as a suitable option for providing fish passage on the Cass River at Frankenmuth. The study and refinements made to the hydraulic model since the public review determined that that criteria for spring spawning and migration flows would be met and that the overbank excavation at the former landfill site would not be necessary as water surface elevations would not increase during a 1% chance (100-year) flood event when compared to current conditions. No structures would be impacted by the modeled changes in flood elevations. Additional minor design changes to the proposed rock ramp that have developed include the addition of 3 weirs for a total of 14 weirs and pools (a change from 11; ramp length does not change significantly), changing approximately half of the weirs to be "partial" weirs to aid in fish passage, shallow excavation immediately downstream of the proposed ramp to create a resting pool for fish beginning the ascent (average depth approximately 2 feet), and addition of a stone vane near the south riverbank between the dam and Main Street (for a total of 5 vanes; 2 upstream of the ramp, two in the vicinity of the ramp, and 1 downstream of the ramp). The upper weir will be located immediately upstream of the dam and the second weir atop the dam. The design phase will determine if a coffer dam is needed to maintain in-stream safety during construction and dam modification. If constructed, it would be constructed of inert material (e.g., stone or steel sheet pile) and located approximately 100 feet upstream of the project.


The EA indicates that the proposed action would not result in significant adverse environmental effects. Adverse effects would include short-term noise, air emissions and traffic from construction equipment operation; temporary, minor turbidity during construction activities; temporary displacement of fish and wildlife during construction; destruction of bottom dwelling organisms in the immediate work area; minor removal of vegetation along proposed access roads; and possible increased passage of the sea lamprey. No significant increase in the 1% flood event elevation is anticipated as a result of the proposed action. Fish and wildlife would return upon completion of construction, and the area eventually would re-colonize with bottom dwelling organisms from adjacent areas. Disturbed areas would be re-vegetated. Although additional lamprey may pass as a result of the proposed action, their reproduction rate would not likely increase due to lack of preferred lamprey habitat upstream of the dam and the U.S. Fish and Wildlife Service's lamprey control methods (i.e., use of lampricides or traps).

This project would alter the stream at this location, but provide numerous benefits. The project would restore access to approximately 73 miles of riverine and tributary habitat, considerably increasing access to desirable spawning and juvenile rearing habitat that was historically available to walleye and other desirable fish species. The rock ramp would replace and potentially provide additional riffle and spawning habitat for invertebrate organisms and fish species such as lake sturgeon. The constructed rock ramp is also anticipated to increase water turbulence, thus resulting in a beneficial increase in dissolved oxygen downstream of the ramp. Some maintenance may be required and / or desired. Such work would not result in significant environmental impacts. Benefits to the Great Lakes fishery far outweigh the potential adverse impacts of the structure and construction activities.

Due to the nature of the project and site specific conditions, construction within the waterway and floodplain was minimized to the extent practicable and could not completely be avoided. The proposed action does not create a harmful interference to life or property at this site. The proposed action complies with the Federal Executive Order 11988, Floodplain Management, because there is no practicable alternative to construction in the floodplain. Pursuant to the Clean Water Act (CWA), an evaluation according to the Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR, Part 230) has been prepared because there will be a discharge of fill material in waters of the U.S. associated with the proposed action (refer to Attachment B of the EA). The Section 404(b)(1) Evaluation concludes with the determination that "the proposed action is in compliance with Section 404 of the Clean Water Act." A Section 401 (CWA) water quality certification, or waiver thereof, would be obtained from the State of Michigan prior to construction. The site is not within the State of Michigan's coastal zone as defined by the Coastal Zone Management Program.

Review of the proposed action for fish passage at the Frankenmuth Dam, and comments received during public review indicate that the proposed action does not constitute a major Federal action significantly affecting the human environment; therefore, an Environmental Impact Statement (EIS) will not be prepared.

30 Nov 12
Date


Robert J. Ells
Lieutenant Colonel, U.S. Army
District Engineer